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FOOD INDUSTRIES

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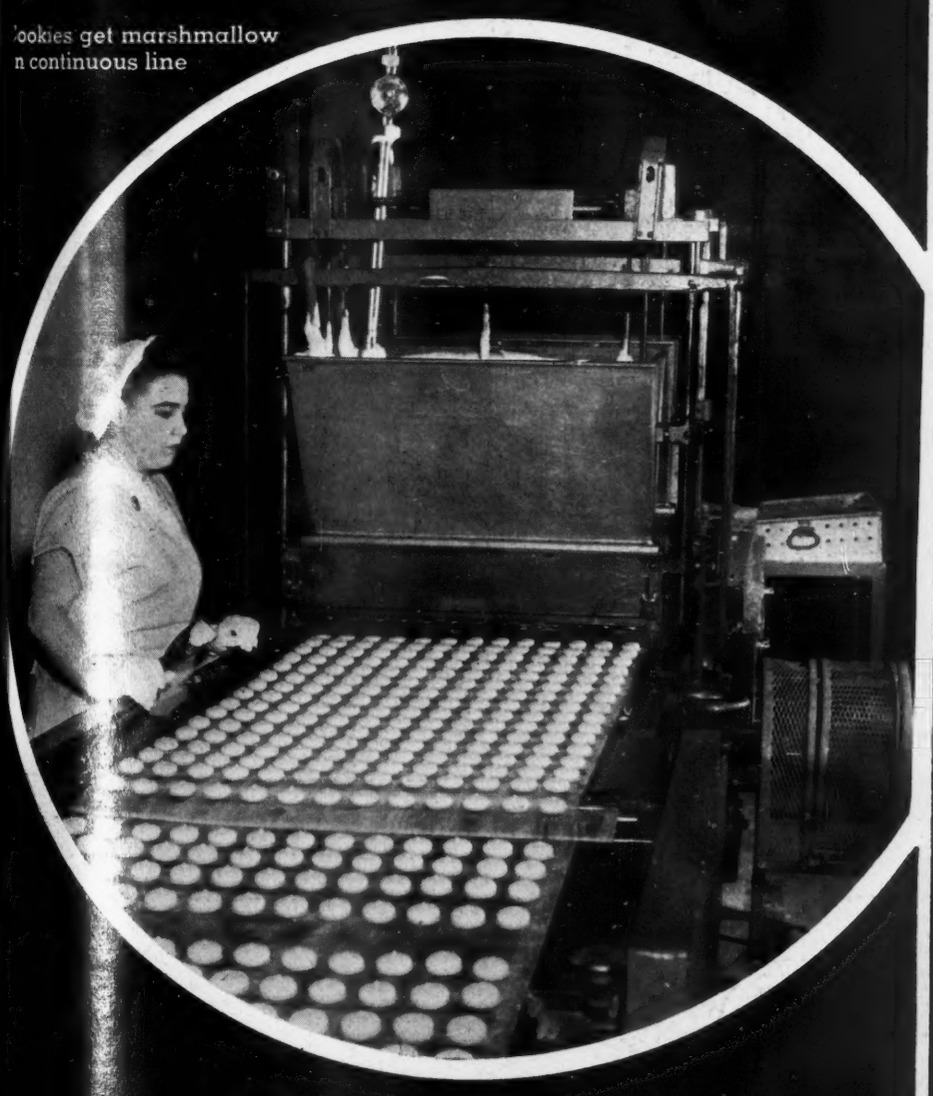

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JULY 1948

IFT Philadelphia Convention Report

Selecting Equipment For the Food Plant

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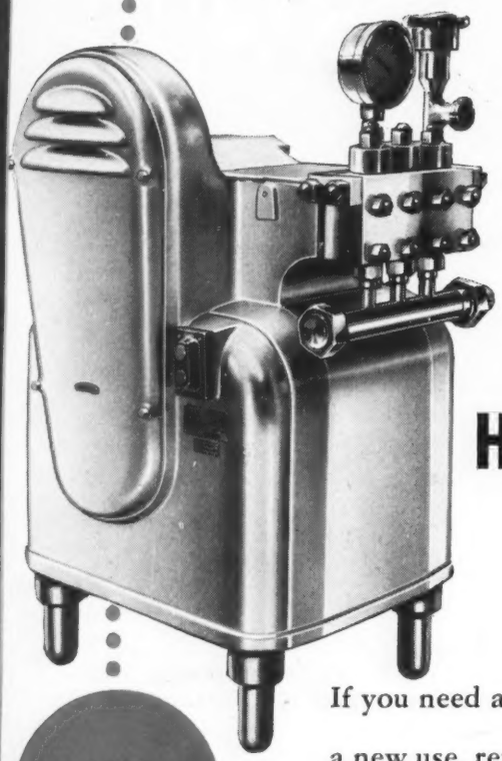

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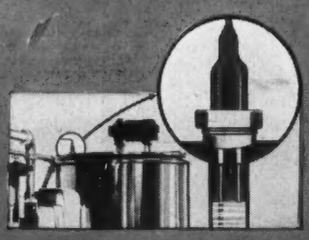
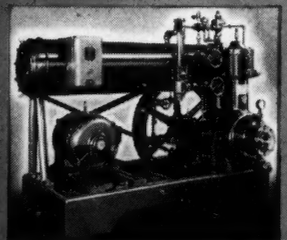
OTHER GOOD  THINGS  FROM

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THE COVER — Continuous line at National Biscuit Co.'s New York City plant, handles about 500 marshmallow cookies a minute. Stainless steel piping feeds marshmallow from an Oakes continuous mixer to the depositor, and the 'mallow is deposited on 13 rows of plain cookies as shown here. Marshmallow-topped cookies travel forward to the chocolate enrober, then on to the packaging line. See page 82 for story.

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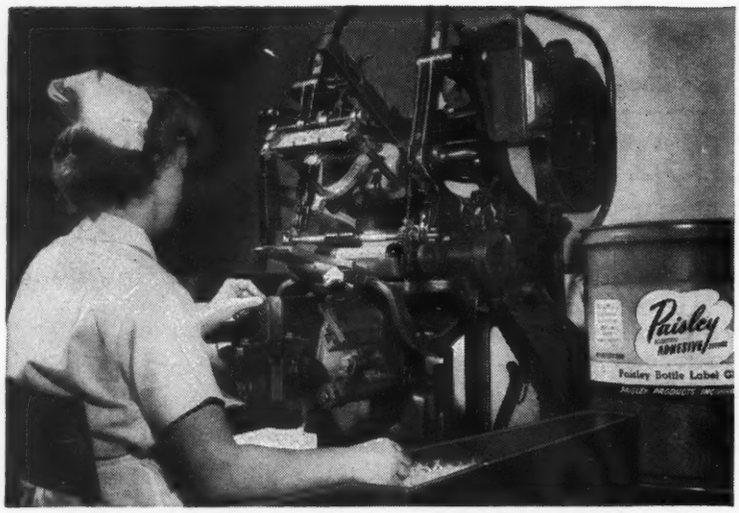

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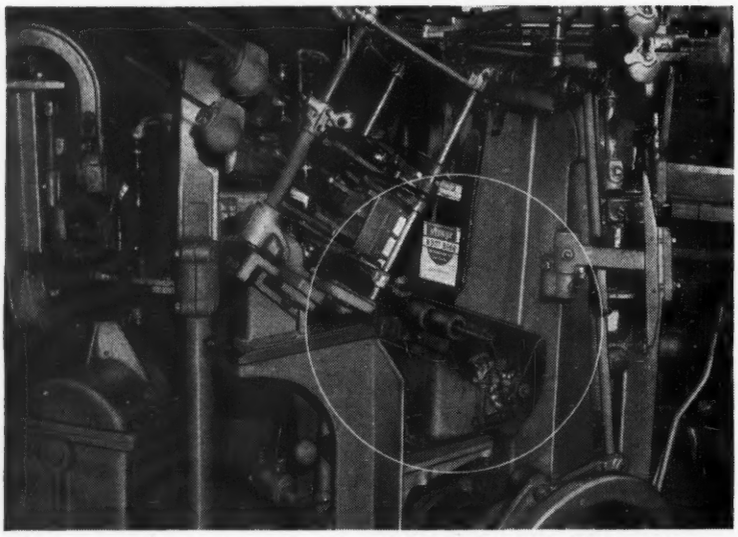

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FOOD INDUSTRIES

JULY, 1948

Cost—Not Profit—Is the Problem

AFTER almost a year of nation-wide research into the high cost of living, the Joint Economic Committee came to this naive conclusion: "To end the cost-of-living, wage and cost-of-production spiral, business can and should adopt moderate price and profits policies, and labor adopt reasonable wage and productivity attitudes, thus achieving price reductions wherever possible."

Voicing such economic platitudes — especially after a year of research—not only is a bit silly, but it is misleading: It strengthens the mistaken idea on the part of the public in general and labor in particular that the profits of business have been excessive.

Profits Are Reasonable

Net profit for 19 leading meat packers was a mere 1.2 percent of the sales dollar in 1947; for 13 dairy products companies, 2.5 percent. The figure for 16 bakeries was a little better—5.4 percent; and 22 sugar refineries reported 8 percent. For 51 processors of other food products, the average was 5.8 percent.

It is evident from these data that the high cost of food would not have been lowered significantly even if food processors sold at cost.

The Joint Economic Committee also urged "mutual efforts by management and labor to avoid any curtailment of production through labor disputes." Up to now, the only way industry has been able to avoid strikes has been to increase wages.

At least the Committee is right about one thing. There is a need to reduce the cost of consumer goods. But many food companies have something even more urgent to worry about. High labor and raw materials costs on the one side and buyer resistance on the other are applying the squeeze on profits. This squeeze has become noticeably tighter in the past few months as the industry returns more nearly to a buyers' market.

Lower Costs Through Efficiency

What is the solution to this problem? Lower prices for raw materials cannot be counted on. Wages likely will go higher. So production and packaging costs must be chiseled. Fortunately, many forward-looking food processors have been spending a large proportion of their profits on new plant and equipment. The increased efficiency thus achieved will stand them in good stead in the months and years ahead. It would be unfortunate, however, if they were to rest on their laurels, and fail to study even their new production lines for further opportunities to increase efficiency. And how much more serious for less modern plants not to search systematically for points to improve in their operations.

Too bad the Joint Economic Committee can't tell you how to raise efficiency—then it would be giving some really worthwhile advice. There are, however, consulting engineers and equipment manufacturers who can help you. And your own managerial and professional employees can do much if they will study each step in each operation and each piece of equipment in each production line. They should ask themselves such questions as: "Why do we do it this way?" "Can we substitute more horsepower for manpower?" "Is there a more efficient machine on the market than the one used here?" "Are all these steps in handling the material and product necessary?" "Can we speed the pace of workers with a conveyor or machine?" "Can we apply an incentive wage scale to increase worker productivity?"

The food processing industry lags behind many industries in the application of highly efficient methods and machines. There are, indeed, opportunities for improvement.

F K Lawler

EXECUTIVE EDITOR

The Talk of the Industry

• ASIDE from increasing the delivered price of practically everything, the recent temporary freight rate increase has affected the competitive advantage of manufacturers in different regions of the country. West Coast canners, for example, face stronger price competition from shippers in the Midwest and South. The advantage of eastern food processors is curtailed somewhat. The freight boost on shipments within eastern territory is more than on goods shipped into that territory from the South or West. All you can do is grin and bear it, depending upon whether you are helped or harmed.

• FOOD exports will be 30 percent below the 1947 average in the last quarter of this year, while imports will be 20 percent higher than in 1947, according to estimates by one authority. This shift to a closer balance comes as European nations gradually improve food production. It will have a depressing effect on commodity prices in this country. That could be good, up to a certain point.

• REACHING a peak in May, canned luncheon meat promotion involved three full-page color advertisements in seven magazines with a total circulation of 33,083,488 copies. The meat industry has no doubts as to the results of its campaign. Canned meat sales have increased 400 percent in the past 10 years with the aid of such promotion.

• COBB'S MILL, an eating place up Connecticut way, has been advertising a special kind of ham known as right sideling ham. It is taken from specially bred hogs trained to lie on their left sides, thus allowing the right side to become more tender. Cobb's further advertises that the left side is eaten only in Jersey.

Well, it's a free country.

• IT would make you happy if you talked for a while to a food processor from England. Your troubles would seem so few and insignificant by comparison that life would be wonderful. Raw materials are so short that anything like full-scale operation is out of the question. To obtain new equipment is a major maneuver. Packaging materials are so scarce that packaging operations as we know them don't exist. Bakers don't put cakes in protective cartons, but in paper bags—when they can get the bags. "Fancy" wraps like cellophane are something bakers dream about.

The situation is so bad that the progressive processor feels frustrated. He visualizes and plans improvements, but finds it extremely difficult to put them into effect. We don't know whether it is indicative of a trend, but one very successful English baker tells us that he plans to buy a bakery in this country and come here to operate it. Could it be that up and coming businessmen will emigrate from England to lands which offer opportunities worth their talents?

• ABOUT one-third of the recommended daily need of vitamin A is met nationally by this component supplied in milk and milk products. A half of this third is carried to consumers in butter. Margarine is another big vitamin carrier. The latter has the advantage of a fortified product in which the minimum is uniform the year round, unaffected by season as is the product of the cow. Competitive facts? Could be.

• COMMUNICATION by radio has become a practical tool in the food industry. At Seabrook Farms, reports go out from the transmitter station to supervisor's cars anywhere in the 45-mile area the farm covers. Now the production department in the company's big plant has direct contact with the field force which brings in the raw materials. Wonder when they will start using television to inspect the crops?

• OLD timers in the food industry may be surprised to learn that the item taken most often from the grocers' shelves is a relative newcomer—baby food. The number of cans or jars purchased is nearly twice as great as for evaporated milk, the nearest competitor, according to a study by Grocery Manufacturers of America. Pounds of flour is next, followed by soup and coffee, then cold breakfast cereals.

It is ironical that the fastest moving item is used by consumers who can't even talk to express a preference, much less read the ads or understand the radio commercials.

Hors d'Oeuvres

• From 1938 through 1946, 81,644 cases in disease outbreaks could be traced to foods other than milk. Only 15,058 could be traced to milk. But water! Water accounted for 122,210 cases. Yet, there are known individuals who persist in drinking the stuff.

• *Seaweed, according to the Scottish Council on Development and Industry, can be utilized in ice cream, salad creams, sauces, jellies and baby foods, among other things. It takes imagination to develop products like these. Probably a little imagination when eating them won't hurt, either.*

• A can of beans, instead of a bottle of champagne, was smashed against the door to dedicate the new warehouse of the New Look co-op stores, says a UAW-CIO release. Wonder if the sponsor did it in one swing.

• *A lot of dairy cows are having their feed grain measured out to them according to their milk scale. Try to behave like humans, will they!*

• Experiments have been made in feeding pulp made from coffee berries to El Salvador's cows, to get coffee-flavored milk. Don't throw away your coffee brewing equipment, though. At least, not until you check on the new stuff's strength and temperature.

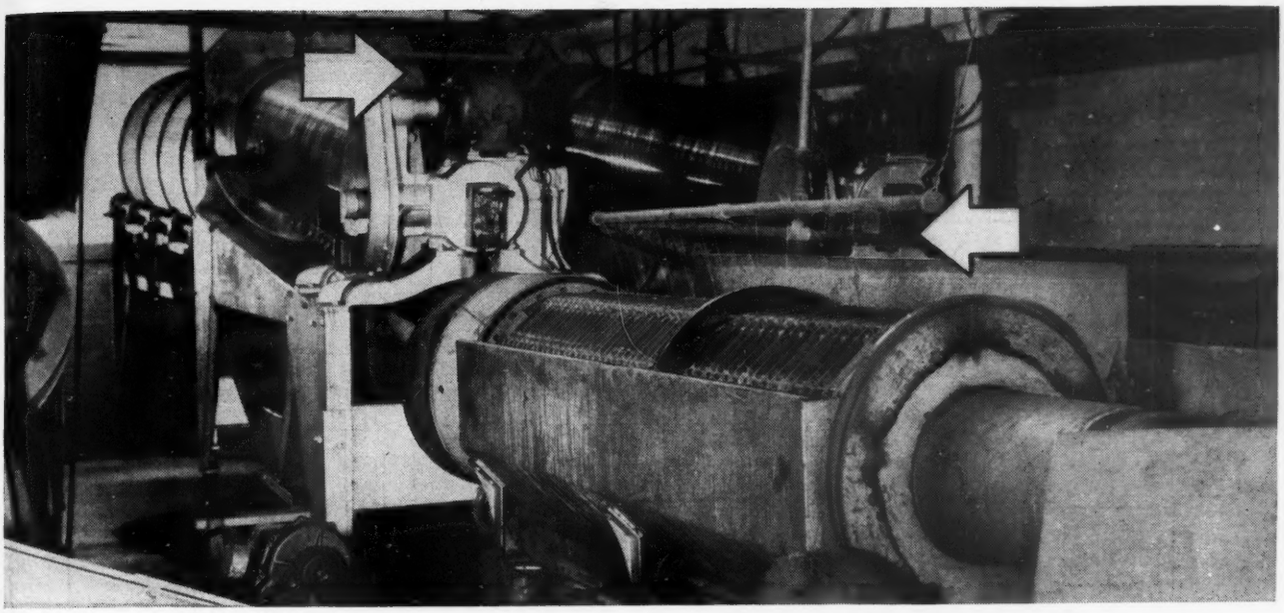
• *Utah is the No. 1 candy state, with a per capita consumption of 34.2 lb. The average for the U. S. is 17.1 lb. On the other hand, the average for the U. S. has never been more than one wife at a time.*

• DuPont is really enthusiastic over their survey that indicated 38.2 percent of supermarket purchases are unplanned, or spur-of-the-moment buys. They have coined a term for them—spurchases. Some of the darndest things sometimes result from surveys.

• *As an antioxidant in lard, USDA has approved the use of thiodipropionic acid, dilauryl thiodipropionate, and distearyl thiodipropionate. Kind of long for shortening, but it evidently works.*

• Last January a country almanac said: "A pork chop, after about next June, will be something to cook and put in your safe deposit box. . . . Ditto beefsteak. As for lamb, it will be a collector's item." But how long after June?

J.A.J.J.



These Chlorine Sprays Improve Processed Green Beans

Inplant chlorination of water supply reduces bacteria and odors, cuts cleanup time. Bacterial content of frozen beans reduced 35 to 56 percent

By RICHARD HAYNES and J. ORVIN MUNDT,*
Tennessee Valley Authority and Department of Bacteriology, University of Tennessee, Knoxville, Tenn.

RESULTS obtained with inplant chlorination—constant low-pressure sprays of chlorinated water maintained over various operating surfaces — indicate effectiveness of this method for reducing the bacterial count of processed green beans.

Coincident with installation of this chlorination, the bacterial contents of products passing over the sprayed surfaces were materially reduced; slime was eliminated from operating and maintaining surfaces, floors and runways; odors, characteristic of vegetable processing plants, were quickly eliminated.

Let us look at the problem: Good sanitation is desired by every operator of a vegetable processing plant. Under prolonged continuous operation, however, slime formations develop and bacteria grow—on equipment, on floors, and in the drainage system. Much of this contamination is passed along to the product, thus detracting from its wholesomeness and quality. Periodic cleanings during brief shutdowns have proven insufficient, due to the resistant nature of the formations and their rapid growths.

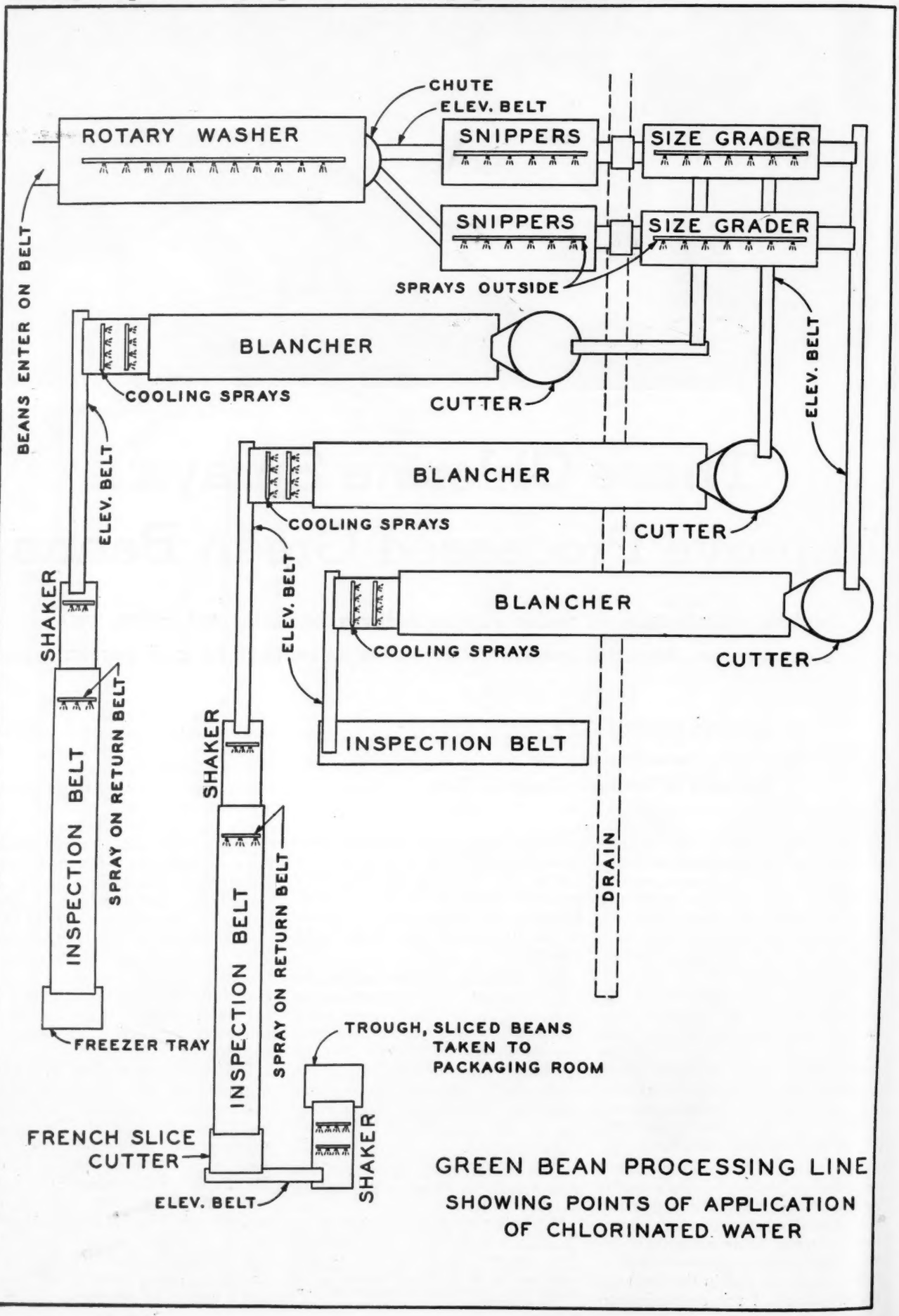
In combating contamination the use of a disinfecting agent in the processing water has proven quite practicable, for water is used generously in the processing of most products. An agent could be used to continuously disinfect both equipment and product, employing existing or additional sprays throughout the operations.

The disinfecting agent perhaps best suited for this use is chlorine. Water treated with small amounts is considered safe for human consumption and is substantially free of obnoxious tastes and odors. However, the quantities of chlorine ordinarily used in rendering water reasonably sterile and safe for drinking are insufficient to impart suitable disinfecting properties needed in maintaining high standards of plant sanitation. Therefore, so-called "Inplant chlorination" has been adopted. This consists of raising the concentration of chlorine in the water several times higher than that used in municipal supplies. Chlorination to this extent has been termed "superchlorination."

Relatively few studies have been published on this subject, although the process of inplant chlorination has been well received. The advantages, as well as precautions of use, have been ably presented by Ritchell[1]. Inplant chlorination apparently was initiated by Scott, and the procedures amplified by the laboratories of the National Canners Assn.[2] Hall and Blundell[3] reported favorably on its use in plants canning and freezing a variety of products.

* The authors gratefully acknowledge the cooperation of W. E. Booker, manager, and the employees of Winter Garden, Inc., Knoxville, Tenn., the technical assistance of G. R. Kavanagh, Wallace & Tiernan Co., Inc., and the suggestions of Dr. D. Frank Holtman and E. G. Grab, Jr., University of Tennessee and TVA, respectively.

Strategically Placed Sprays Treat Both Equipment and Beans



In a study of inplant chlorination in a southern plant processing green beans for freezing, the advantages cited were amply confirmed. These included: Ready removal of accumulated slime on equipment and on floors; replacement of the "typical canning plant odor," characteristic of ripe and decaying vegetables, with the slightly chlorinous, unobjectionable, clean odor; and easier cleaning of equipment, with less time required for general plant sanitation.

It is the purpose of this article to amplify previous reports in regard to the effect of inplant chlorination upon the bacterial populations of the equipment and the product.

In the plant in which this work was done, green beans were washed, snipped, and size-graded under sprays of water. No spray was used on the conveyor belts to the cutter or in the cutters. Spray was used as the cooling agent following steam blanching, and again on a shaker washer prior to inspection. Cut beans received no further spray, however. French-cut beans were given an additional wash after slicing, prior to bulk packing. The equipment layout and location of sprays are shown in the flow diagram accompanying this article.

Experimental Procedure

Complete bacteriological studies and sanitary inspections were made twice weekly throughout the entire packing season. Swabs were made of the equipment surfaces—both those with which the product came into contact, such as belts, and those influencing the bacterial content, as the outside of the snipper. Samples of the product were taken at various operating points, such as washing, snipping, grading, cutting, blanching and cooling, elevation prior to inspection, inspection, and after freezing. All bottles containing swabs and all samples were quickly chilled immediately after sampling.

Samples and bottles were then transported to the laboratory and refrigerated until actually plated, within three hours after leaving the plant. Sanitary inspections—including examination for accumulated slime, dirt (general cleanliness), and determination of odor—were made at the time samples were obtained.

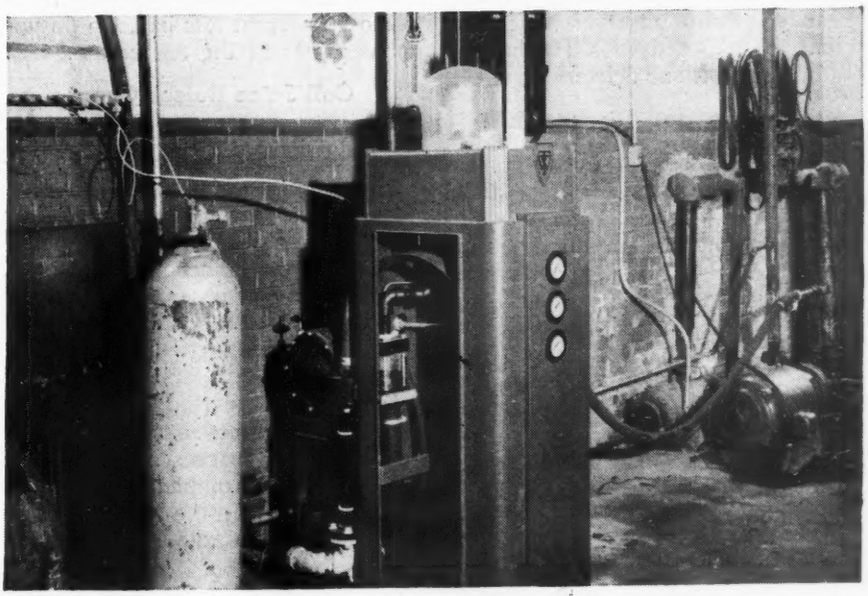
During the first half of the processing season, municipal water was used. It had been treated at the origin with chlorine to give "breakpoint" chlorination — i.e., sufficient chlorine to give free available chlorine residual over and above that which combines with various organic and inorganic materials in the water. By the time this water was received at the plant, however, it had lost its free available chlorine residual and, for all practical purposes, its disinfecting properties, although, of course, it was free of bacterial contamination.

Chlorinator Installed

The chlorinator was put in at the height of the packing season. Flow of raw material into the plant did not permit any cleaning other than that practiced each day as regular routine. In the interest of economy, a switch was made at this time to well water, which was then generally employed through the remainder of the season.

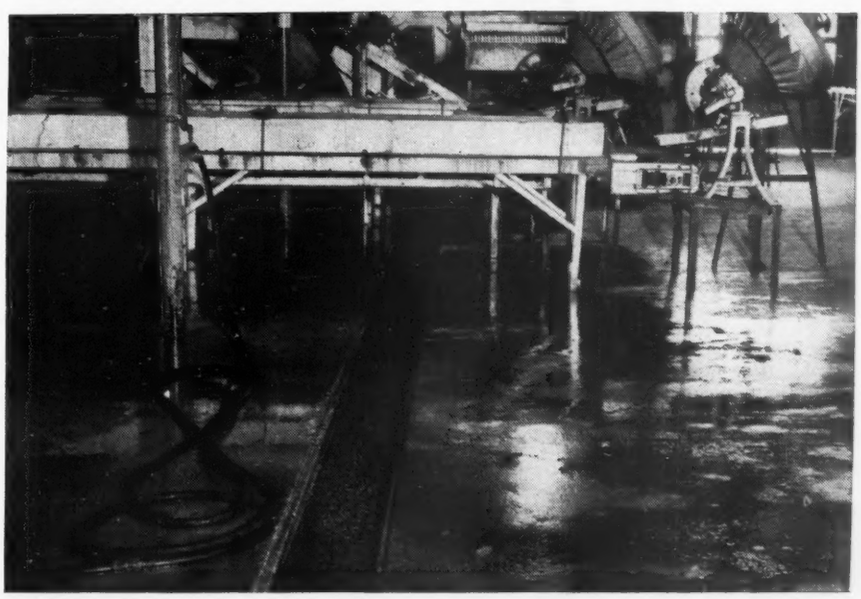
During the first week of operations under inplant chlorination, the well water was given a dosage of 17 ppm., and thereafter the dosage was reduced to 13 ppm. for the remainder of the test period. Free available chlorine, as determined by the ortho-tolidine-arsenite test with the aid of a color comparator, at no time was less than 5 ppm. At cleaning time, between shifts, the chlorine dosage was increased to about 50 ppm.

Prior to the installation of the chlorinator, the effect of the free chlorine in water upon beans was determined. Up to a concentration of 500 ppm. there was no effect upon the appearance, odor, or flavor. But at the level of 1,000 ppm.—far above



When Cl Goes In . . .

FROM cylinder, dosage of 17 ppm. chlorine is put into plant's well water, via a Wallace & Tiernan chlorinating unit. During cleaning periods, dosage was stepped up.



. . . Slime Goes Out

WITHIN three days after Cl dosage, there came this gratifying result—complete elimination of slime from floors and runways. This banished an accident hazard, odor source.

Swabs and Plate Counts Demonstrate How Bacteria Populations Drop

TABLE I.—REDUCTION OF BACTERIA on 4 Sq. Cm. Surfaces of Pre-Blanching Equipment Before and After Introduction of Inplant Chlorination, as Determined by Swabbing.

Equipment	—Cumulative Average— Before chlorination	After chlorination	Percent reduction
Sheet metal chute following washer	8,000	300	96
Conveyor belt following washer	13,000	900	93
Snipper, outside surface	150,000	37,000	75
Link of grader	66,000	32,000	47
Conveyor belt to cutter	105,000	65,000	38

TABLE II.—NUMBERS OF BACTERIA ARE LESS Per Gram of Product at Various Stages of Pre-Blanching Processing Following Inplant Chlorination, as Determined by Plate Count.

Stage of treatment	— Cumulative Average — Before chlorination (thousand)	After chlorination (thousand)	Percent reduction
Raw (no treatment)	6,100	6,200	—
Washed	1,400	990	29
Snipped	175	99	42
Graded and conveyed to cutter	630	320	49
Pass through cutter	1,020	398	61

any practical application—a brownish discoloration, evident only by comparison with untreated beans, was observed. This result differs from that reported by Hall and Blundell,[3] who observed that peas could be exposed to a residual of 1,000 ppm. with no deleterious effect.

Results and Discussion

Tables I and II present, respectively, the bacterial counts obtained on swabbed 4-sq.-cm. areas of equipment, and of the product passing over the pre-blanching equipment. The area swabbed on the sheet metal chute was in the center, and friction of beans passing continually over this surface kept the population at a minimum, although the bacterial count of the washed product passing over this surface was high.

Beginning with the low counts obtained on the conveyor belt, the bacterial populations on the surfaces of subsequent pieces of equipment increased, even after chlorination was initiated. This can be accounted for on two premises: (1) The water playing upon the snipper and the grader was not under great pressure and was insufficient to remove the accumulation of slime and dirt; and (2) in the snipper the ends of the beans are sheared off, with resultant liberation of cell juice which is somewhat mucilaginous in character.

Bacteria are retained on these surfaces much more tenaciously than on surfaces of equipment that the product had previously passed over. Despite these conditions, the bacterial populations of these surfaces were noticeably decreased after chlorination was initiated—there being from 38 to 96 percent less bacteria on various pieces of the equipment.

Cell Juice Raises Count

Liberation of mucilaginous cell juice will also account for the increased population on the product after passing through the cutter. The slimy material unavoidably accumulates at the outlet beneath the knives, and all product passing through the outlet acquires a bacterial load. No swab count is given for cutter surfaces, for the cutters were located above and at the head of the blanchers. All surfaces except those of the relatively inaccesible knives and the outlet were completely dry. There was no change in the bacterial population of vane and vent surfaces after chlorination.

Slime Accumulation

Previous authors have drawn attention to the accumulation of dirt and slime upon the surfaces of the pre-blanching equipment, and this point bears repeating. It was noted that slime accumulated to a great degree on all surfaces over which the product did not pass—i.e., runways and guides. Standards, crossbars, the collecting pans under the snippers, and guides above the flow of beans were heavily coated. But with inception of chlorination, the slime no longer accumulated on those parts accessible to the water spray.

A similar effect was noted on the odor. As for the pre-blanching equipment, the odor at the snipper was most pronounced, probably because of the liberation of cell juice and subsequent bacterial action. After chlorination, no putrescent odor was noted at any of the equipment.

Especially gratifying was the effect of chlorine upon the slime on the floor and runways. Within three days after chlorination the floors were clean, and thus the greatest accident hazard at the plant was eliminated.

Post-Blanching Conveyor

Table III presents: (1) The average bacterial populations of the surfaces of post-blanching conveyor belts when no spray is used; (2) when plain or chlorinated water is played upon the belt rising over the roller; and (3) the populations of the product under these varying conditions. This same data is presented in bar form in Fig. 1 which adjoins the table.

There appears to be a contradiction of results when the populations of the center and the side of the inspection belts are compared. Water alone seems to increase the population in the center, and materially decrease it at the side. This may be accounted for by the fact that much the greater quantity of the product

"With" Versus "Without" on Green Bean Inspection Belt Surfaces

TABLE III.—COMPARISONS OF BACTERIAL POPULATIONS on Conveyor Surfaces of Post-Blanching Equipment With No Spray, Water Spray, and Spray of Chlorinated Water, as Determined by Swabbing 4 Sq. Cm.

Equipment	Bacterial Populations — No spray (thousand)	Water without chlorine (thousand)	Percent change	Water with chlorine (thousand)	Percent change
Inspection belt, center	230	250	+ 9	50	—78
Inspection belt, side	300	60	—80	23	—93

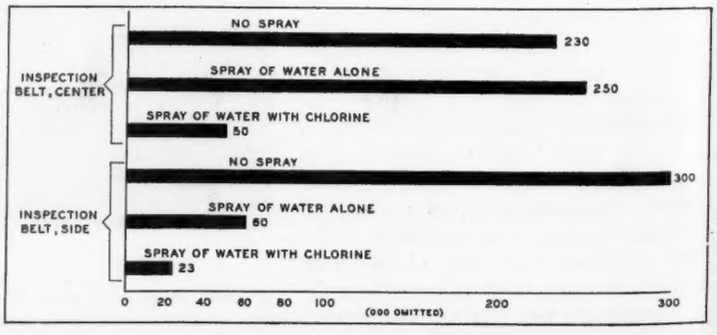


FIG. 1. (Right): BACTERIA POPULATIONS of belt as determined by swabbing 4 sq. cm. (data from table above).

Bacterial Counts on Product Show Effect of In-Plant Chlorination

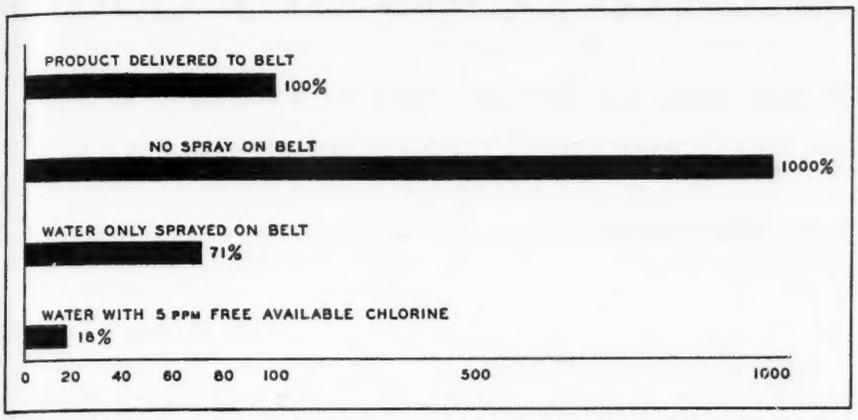


FIG. 2. HOW count on product is affected by spraying of inspection belt. Product delivered to belt has been assigned a count-value of 100 percent for comparison.

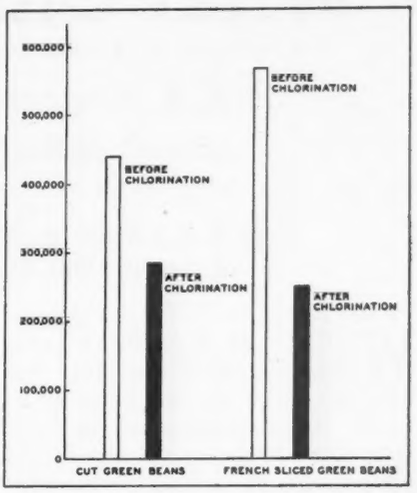


FIG. 3. COUNT per gram of product before and after installation of inplant chlorination. Bars represent logarithmic averages of many samples taken throughout season.

is passing over the center. The pressurized contact of the product with the belt, under the sweeping hands of the inspectors, not only forces out relatively greater quantities of fluid cellular constituents which become bacterial food, but also impresses them more firmly upon the belt, making subsequent removal difficult if only a relatively weak spray is used.

In both sides and center, however, surface-population reduction attributable to chlorine is quite gratifying —78 percent and 93 percent less, respectively.

Although water playing upon the belt seemingly increases the surface population at the center, the effect upon the population of the product is reversed. Apparently, loosely adhering, contaminating substances are quite easily removed by the spray of non-chlorinated water — without affecting the swab count, yet reducing the number of organisms that are easily removed by the product.

The first and third bars of Fig. 2 indicate that when water alone is used on the belt (but not on product), there is a slight reduction in the bacterial population of the product coming from the inspection belt, as compared with the product delivered to the belt.

However, a more striking illustration of the effect of this water is shown by comparison of the second and third bars of this figure. The second bar shows that when no spray is used, the plate count of the product after inspection is nearly 1,000 percent, or 10 times greater than that of the product dropping upon the belt. The third bar demonstrates that the bacterial content of the product after inspection, when water alone is used, is 29 percent less than that of the product upon delivery to this belt. The addition of chlorine to the extent of 13 ppm. at the intake—5 ppm. free chlorine at the sprays—reduces this population still further, to an average of 18 percent of that of the delivered product.

It will be noted that there is a substantial, but not a total, reduction of bacteria on the belts attributable to the chlorinated water spray. Vaughn, Stadtman and Kueneman[4] have indicated that despite vigorous food-plant sanitizing procedures, picking belts over which starchy foods pass may yield as high or higher swab counts after cleaning than before.

In the present study, such results were not encountered, probably because of the more juicy, less adhesive nature of the food. Vaughn, Stadtman and Kueneman[4] propose the explanation that, with use, the belts develop minute cracks and crevices, which open and close with passage over the rollers. Bits of food lodge in the crevices, then ferment, and discharge heavily seeded inocula. It seems reasonable that sanitizing procedures do not remove materials below the surface, or within the belt.

Finished Frozen Product

The effect of chlorination upon the bacterial count of the finished, frozen product is shown in Fig. 3. The logarithmic average of all samples of cut green beans plated before the installation of the chlorinator was 440,000 per g., and after installation 285,000, a reduction of 35 percent. For French style beans the averaged counts were 570,000 and 250,000, respectively, a reduction of 56 percent. As previously indicated, French style beans are given an additional spray after cutting to remove small bits of debris.

When interpreting these specific results, consideration should be given to the fact that, at the time of installation of the chlorinator, there was no opportunity for a special cleaning of the surfaces of the equipment. Throughout the season, inspection belts were scrubbed at least once daily with Oakite and solutions of hypochlorite. The quality of scrubbing, as determined by watching the process, was mediocre, as was also the cleaning of such auxiliary surfaces as rollers, standards and guides. Furthermore, some surfaces, such as those of inner rollers and guides, were completely inaccessible. Short of dismantling the equipment these parts could not be cleaned; dismantling, of course, is out of the question during the packing season.

The nature or type of spray undoubtedly affects the efficiency of chlorinated water in reducing the numbers of bacteria on equipment and product. As noted in our first photo, the sprays consist of streams of water emanating from small holes bored through sections of pipe. Had spray nozzles been used, and the water pressure been increased substantially (pressure used here was probably as low as 10 to 20 psi. on belts, snippers and graders), reduction in bacterial population by virtue of the sprays might well have been more pronounced.

The bacterial reductions reported are neither spectacular nor complete. However, the use of water containing free available chlorine does provide the plant operator with an additional means of meeting a standard of not over 500,000 bacteria per gram (plate count) which the Frozen Food Institute advises its members to use as a guide in the purchase of foods.[5]

The cost of chlorine, used in treat-

(*Continued on page* 202)

What Glutamate Does in Food

M. S. G., utilized in pure form, has its own value as a flavor adjunct, distinct from the place occupied by protein hydrolysate

By S. E. CAIRNCROSS and L. B. SJOSTROM
Arthur D. Little, Inc., Cambridge, Mass.

WHEN used in food, monosodium glutamate augments and improves most flavors even when added so sparingly that its own taste is not noticeable. It blends and rounds out flavoring, often suppressing undesirable notes.

Like many of the things added to foods to improve flavor and palatability, glutamate came originally from the Orient. While its use in Chinese food and in canned and dehydrated soups is fairly well known, it has a much broader application in the preparation of cooked foods generally, but its possibilities are not so well known.

Because of opinions expressed in the early literature, the idea exists that monosodium glutamate has a meat-like flavor capable of producing meat flavor in non-meat dishes. It is true that vegetable protein hydrolysates which contain glutamate do have a peptone, broth-like flavor which lends itself to the preparation of meaty-tasting but meatless gravies and dishes. In the early commercial forms, monosodium glutamate was a crude, colored product of high salt content and possessing a considerable amount of protein hydrolysate flavor.

Because of lack of experience with the pure chemical, its true effect was not dissociated from that of the accompanying hydrolysate flavor. The taste and flavor characteristics of the pure substance were then known only to the few who had examined the freshly purified chemical.

Chemically Pure

With the increasing commercial use of glutamate in America and the application of American technology to its production, the product now is becoming standardized as a material of high chemical purity. It is available on the market as a pure white crystalline powder, free from discoloration, and practically free from odor and hydrolysate flavor.

In surveying the field of application of glutamate in its newly-available form in foods, the question naturally arises as to the relative importance of the pure chemical and of the highly flavored hydrolysate components which formerly accompanied it.

Not much information was available on pure glutamate. Accordingly, the role of pure glutamate in both meat and non-meat dishes was examined with the purpose of determining its action in altering and improving food flavor. Also, the relationship of glutamate to meat flavor was investigated.

This work showed that monosodium glutamate in its present highly purified form is low in odor and contributes primarily a sweet, salty taste to food which is of lower intensity than many of the flavors commonly present in the finished food.

Effect Compared

By contrast, the hydrolysate products, derived from protein containing up to 20 percent of glutamic acid, exert their effect in part by the activity of the glutamate but in larger part by that of strongly-flavored chemical derivatives of the amino acids.

The natural amino acids, other than glutamic, have in general very little flavor, but when heated together or prepared in crude condition, the mixtures develop characteristic odors and tastes, which are best described as "hydrolysate" flavor. The hydrolysate type of product is useful in supplying its own characteristic peptone-like flavor to foods and sauces. Glutamate, on the other hand, modifies existing flavor without adding anything new. In modifying sauces with either glutamate or hydrolysate it is important to judge the flavor effect in two ways. One is the effect on the sauce, the other is the effect when the sauce is added to food. Glutamate appears to be quite compatible with a much wider class of foods than are the hydrolysates and has been found to improve the palatability and appeal of most cooked dishes.

What It Does

The following are some general observations on the effect of glutamate in food:

Monosodium glutamate added in small amounts has a pronounced effect on the flavor of practically all foods to which it is added, without itself being noticeable. (Exceptions: It is very noticeable in certain fruits and dairy products.)

Under the same conditions glutamate has an effect on food aroma, without contributing any noticeable odor itself. (0.1-0.3 percent.)

The principal effect on food flavor is a balancing, blending and rounding out of total flavor.

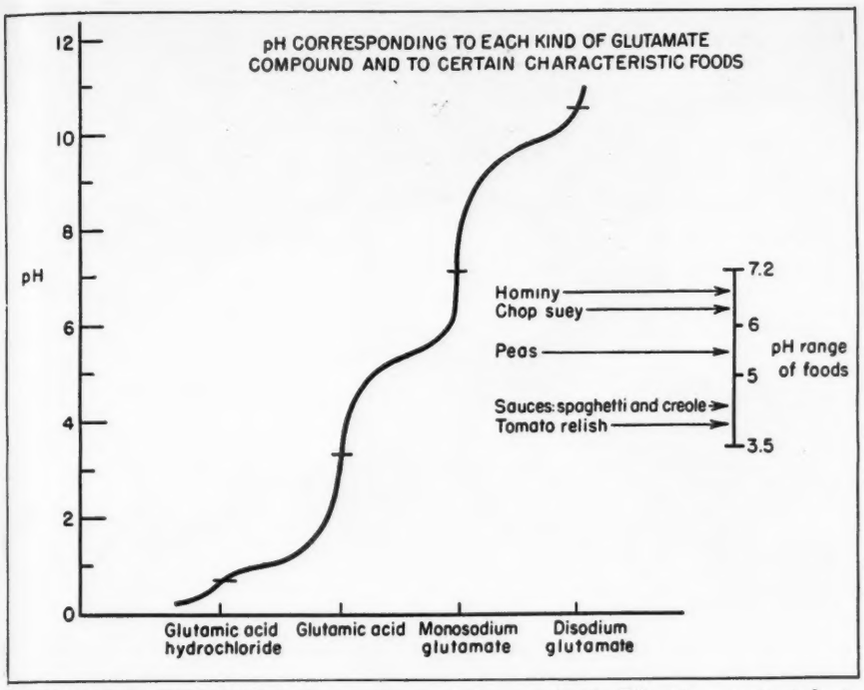
Flavor appeal is frequently improved, most notably in the case of meats, seafoods, stews, soups and chowders.

Cooked vegetables are markedly improved in flavor by glutamate addition but the following are highest on preference rating: mushrooms, sweet corn, asparagus, broccoli, green and lima beans, spinach, cauliflower, Brussels sprouts, squash, parsnips, onions, and dehydrated cream style vegetable soups. In such cases as carrots and cauliflower the natural flavor characteristics are intensified. This suggests application for reinforcing the flavor of foods held on steam tables. For canned corn, canned lima beans, and dehydrated and reconstituted vegetables maintained for more than an hour over a hot water bath, monosodium glutamate aids in combatting steam-table flavor.

Fruits, fruit juices, sweet baked goods, some dairy products and cooked cereals, in a limited series of experiments, were not found to be benefited by use of MSG.

It has been found that glutamate suppresses undesirable flavor factors in the following cases:

1. The sharpness in onion flavor.
2. Rawness in many vegetables and some meats.
3. The flavor of peel and earthiness in vegetables, particularly potatoes.



MONOSODIUM GLUTAMATE covers pH range of many foods. Effect is accentuated at lower pH values, is most desirable in foods in the pH range of 5.5 to 6.5.

4. A volatile characteristic note in boiled rice.
5. Bitter tastes in a few freshly opened canned vegetables.
6. A fishy note sometimes present in lima beans.

General Physiological Effect

When a small quantity of monasodium glutamate is placed on the tongue, an immediate and long lasting effect is noted. The taste is pleasant, mild, slightly sweet and saline, imparting a general sense of satisfaction. Salivary secretion is increased, and this effect is noted for approximately half an hour. The dry salt produces a slight sensation of furriness on the tip of the tongue, and mild stimulation in the throat and the back part of the mouth. Although the above effects produced by the dry salt are not prominent when properly added to foods, they do supply some clue to the mode of action of glutamate in modifying food flavors. Aqueous solutions gave similar taste effects but were practically odorless. It has been postulated that increased salivary secretion favors release of flavor from food and provides a more intimate contact between the food and the taste buds. The long lasting stimulation of the mouth by glutamate probably serves to out-last and counteract some of the unfavorable after-tastes. The feeling of mouth satisfaction experienced with glutamate may be a factor in augmenting food flavor appreciation.

Glutamate has been investigated in foods in the pH range 3.5 to 7.0. A taste titration curve indicated that glutamate taste was notable throughout this range, and is accentuated at the lower values of pH. The foods in which the effect was most desirable happened to lie in the range pH 5.5 to 6.5. Attempts to determine the relative effect of pH on glutamate effect in a single food were, however, unsuccessful. Changing pH of chicken broth by as little as $\pm$ 0.5 units produced flavor changes greater than those produced by glutamate.

The flavor changes were not corrected by adding glutamate. Our general observation was that glutamate was effective in the pH range of 4.0-7.0, the limits being represented by certain tomato products and hominy.

Effect of Demulcents and Fats

Observations made on aqueous solutions and dispersions of flavoring agents do not correlate exactly with those found in food. Foods generally have higher viscosity and usually contain fats and oils. These factors markedly affect the balance of a flavoring system. Consequently, we have begun a series of studies on the fundamental taste factors in thickened non-food media. Using one percent solutions of carboxy methyl cellulose we have observed a pronounced demulcent effect; sweet, salty, sour and bitter tastes were suppressed and the effect of low concentrations of glutamate was suppressed. At higher concentrations taste seemed to be more pronounced and longer lasting. At higher concentrations of glutamate bitterness and sourness were suppressed. Well seasoned non-meat gravies were prepared with cereal thickening agents and no fat, and glutamate was found to improve their flavor. Addition of shortening suppressed all flavor, requiring development of a new seasoning and flavoring at a higher level. Glutamate effect on this system was less pronounced than on non-fat gravy.

Effect of MSG on Other Tastes

In examining fundamental tastes we have found that glutamate accentuates sweetness in a food when sweetness is near its optimal value. At higher values it has no great effect. The same rule applies to saltiness. When farina and mashed potatoes were salted with 75 percent of the optimal amount of salt, 0.1-0.2 percent MSG could supply the remainder. Glutamate alone could not adequately supply salt value to these foods.

Tests with aqueous solutions indicated that glutamate appears to be more salty than salt at the 0.1-0.2 percent level (subthreshold level of salt) and at threshold levels glutamate adds some saltiness to salt solutions. Above threshold, saltiness of salt solutions is not greatly increased by adding MSG.

Sourness accentuates glutamate taste. Glutamate seems to suppress sour taste and odor in certain vegetables but not by affecting pH. The relationship of pH and glutamate effect needs further investigation.

Glutamate appears to suppress bitterness in saccharin solutions and in certain vegetables, but the effect is not general.

The Philosophy of Seasoning

Full understanding of the effect of glutamate and related materials requires development of a general philosophy of seasoning. The best flavor in food is one which appeals simultaneously to all of our flavor-detecting senses, i.e., odor, taste and feeling. An aroma is needed to make known the presence of the food, taste to entertain the tongue, and finally, a pleasant combination of texture and tang to make us realize that the food is at its best in all ways. If any of these sensory elements is missing, the food is flat and uninteresting. It is the function of additives to supply the missing element.

Seasonings supply taste but no odor. They are of value whenever taste is deficient and aroma is ade-

(*Continued on page* 200)

1. BATCH of gum, 700 lb., comes from steam jacketed kettle mixer every hour. There are three kettles in operation, each powered by a 15 hp. electric motor. Steam at 15 to 20 psi., temperature 215-240 deg. F., provides 175 deg. F. cooking heat.

BUBBLE GUM

By WILLIAM K. BRAME, Plant Engineer and Superintendent,
The Paris Gum Corp. of America, McAllen, Texas

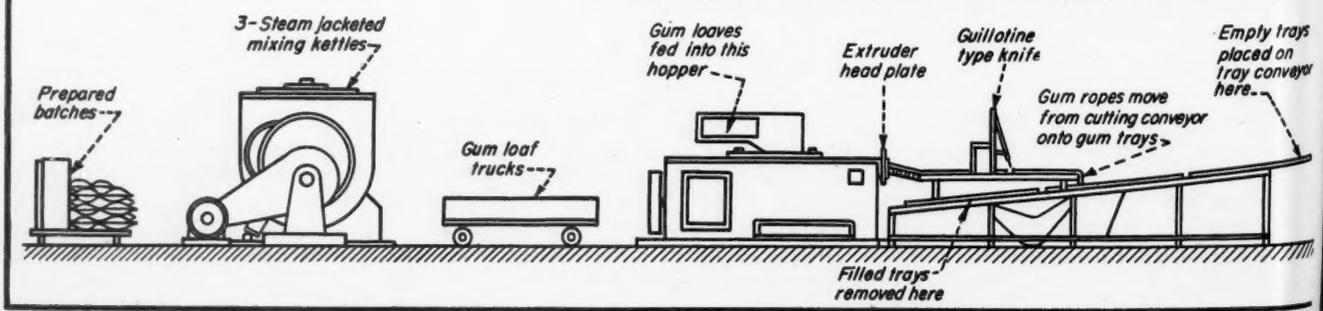
TEXTURE, flavor and keeping qualities of bubble gum—now a $21 million-a-year business — depend largely upon constant technological controls. Moreover, sanitary conditions, which are of equal importance, prevail throughout the entire manufacturing process.

These fundamental requirements are emphasized at the new modern confectionery plant of The Paris Gum Corporation of America, currently turning out more than 25 tons of bubble gum a day. The plant has the capacity to produce more than 25 percent of total national annual sales. Construction was begun in July 1947, and three months later, in October, bubble gum, the confection so highly regarded by the "junior set" began to roll off the lines.

The principal ingredient of bubble gum is its base which is a compound of either natural or synthetic latex, edible waxes and resins. To this are added a plasticizer, powdered sugar, flavor, coloring and corn sirup.

To eliminate error in compounding the ingredients for mixing, each batch is arranged on a separate pallet and when needed it is moved into the mixing room on a hand lift-truck. Batches for the three 8-hr. shifts are prepared under direct supervision of the assistant plant superintendent during the day. Each one weighs about 700 lb. Gum makers are instructed how and when to add each ingredient to the batch in the kettles.

FLOWSHEET OF BUBBLE GUM PRODUCTION AT PLANT


Prepared batches
3-Steam jacketed mixing kettles
Gum loaf trucks
Gum loaves fed into this hopper
Extruder head plate
Guillotine type knife
Gum ropes move from cutting conveyor onto gum trays
Empty trays placed on tray conveyor here
Filled trays removed here

2. LOAVES of gum are fed to the kneader and extruded from the headplate as ropes. The guillotine-type knife cuts the ropes to the desired length as they are carried along on the belt, which delivers them to trays moving in the opposite direction.

Its Manufacture Is As Modern As the Confection

Batches are mixed approximately 1 hr. at a temperature of about 175 deg. F. and the material is under constant agitation to insure a perfect mix and a uniform consistency. From the kettles, batches are dumped, by hydraulic lift, into gum trucks. The mass of gum is then cut into loaves.

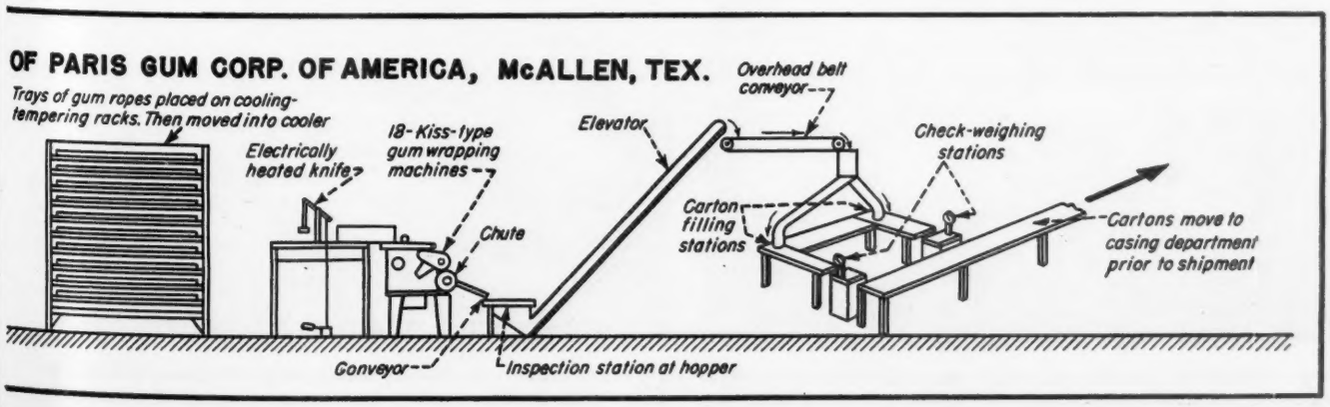
Temperature of the gum loaves is watched carefully, and at the optimum point the loaves are fed into the extruder. From the extruder hopper, the loaves are picked up by two auger-type screws comprising the kneader, and forced, at high pressure, through two cylinders and out through the 16 round holes in the head-plate. These holes are of approximately 13/16 in. dia.

Extruding

The gum, now in continuous ropes, is extruded upon a roller conveyor and thence upon a belt conveyor. Powdered sugar is dusted on the ropes to keep them from sticking. The conveyor moves the ropes under the guillotine-type knife and they are cut into uniform lengths. From the knife, the conveyor carries the ropes to a guide which turns them downward and they drop upon the gum tray, which is moving in opposite direction to the gum conveyor.

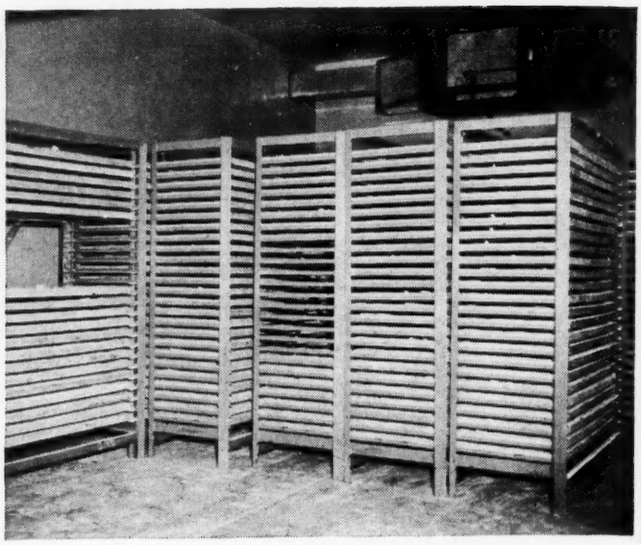
All operations of this extruder are exactly coordinated. If conveyors, knife or other equipment move at a speed at variance with any of the other operations the gum rope will be distorted in diameter or shape. A change in original diameter would result in finished gum pieces of odd sizes and weights.

In order to fill the gum trays with 32 ropes each, trays are returned from the exit point and run through the conveyor again, receiving a sec-


OF PARIS GUM CORP. OF AMERICA, McALLEN, TEX.
Trays of gum ropes placed on cooling-tempering racks. Then moved into cooler
Electrically heated knife
18-Kiss-type gum wrapping machines
Chute
Elevator
Overhead belt conveyor
Check-weighing stations
Carton filling stations
Cartons move to casing department prior to shipment
Conveyor
Inspection station at hopper

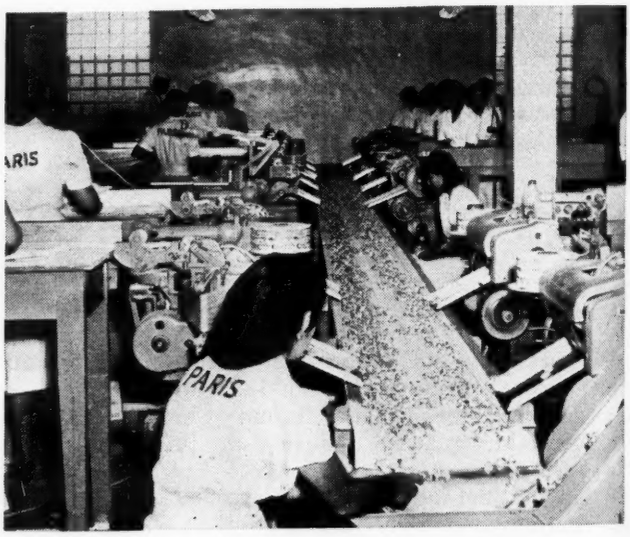
How Gum Ropes Are Tempered and Aged, Cut, Wrapped and Packed

3. ROPE DIAMETER is of critical importance to final weight and size. Operator checks the diameter with a gage.



4. RACKS loaded with trays of gum are tempered and aged in air conditioned cooling room. Temp. is 65 deg. F., R. H. 45%.

5. OPERATORS cut the gum ropes with stainless-steel electrically heated knives. Ends are then welded together.



6. GUM ROPES are brought to operators and arranged for them on stainless steel tables. There are 18 wrappers.

7. WRAPPED bubble gum drops from main central conveyor to elevator hopper, where an operator inspects wrapping.

8. CARTONS are filled by weight with 120 pieces of wrapped gum. Cartons travel by belt conveyor to casing department.

STORAGE room for finished product is air conditioned to assure quality. Pallets are moved to and from storage by hand-operated lift trucks.

ond load of 16 gum ropes. The loaded trays are then placed in racks and moved into the cooling-tempering room.

Tempering and Aging

Capacity of this cooler, where temperature is held at 65 deg. F., and relative humidity at 45 percent, is 30 gum racks, or about 21,000 lb. of gum. It remains in this cooler for about 6-8 hr., then is moved into the wrapping room.

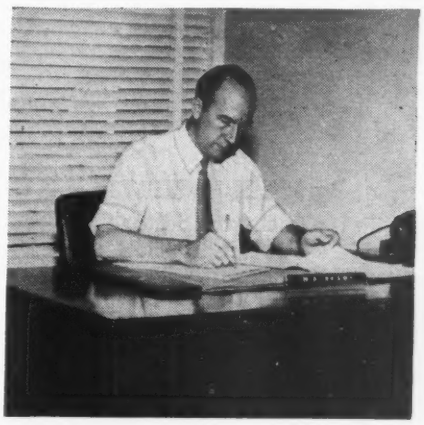
Temperature in the wrapping room is held between 71 and 76 deg. F. and R.H. between 40 and 45 percent—aiding the work of the wrapping machine operators, since the gum then does not become sticky. Wrapping machines operate efficiently under these conditions, but any significant change in temperature or humidity will cause the cutting knives to accumulate gum on the blade and thereafter, when cutting the gum rope, they will distort the shape of the gum piece.

All 18 wrapping machines (kiss-type) discharge wrapped gum onto a central conveyor, and it moves to the elevator and thence along an overhead conveyor to the packaging and casing department. Later it is put in temporary storage prior to shipment. This temporary storage is in an air conditioned room. Movement to storage and from it is by hand-operated lift trucks, employing pallets.

Regulations regarding cleanliness and sanitation in the plant are rigidly enforced. No smoking is allowed, and all employees are provided, free of charge, with white cotton gloves. Men operators are supplied with white overalls; girls with white dresses, and hair nets. Besides the hair nets, girls must also wear scarves around their heads—a double precaution.

Plant Washed

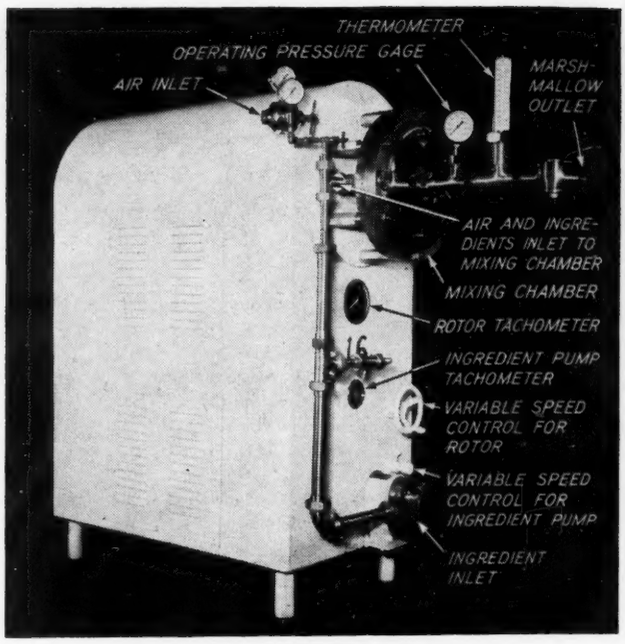
Each department has its own clean-up man for each shift, and he is continually at work keeping the department in a sanitary, neat condition. Floors are washed down twice a day, and the entire plant is sprayed, with an approved insecticide. Each weekend, all equipment is taken apart and washed down with hot water. Walls, ceilings and floors are also washed with hot water each week. Clean-up operations on a 24 hr. basis prevents the possible accumulation of powdered sugar, paper and any other materials on the floor or equipment.



WILLIAM K. BRAME, company superintendent and author of this article. He aided in design and construction of plant.

MODERN construction, design and materials have been utilized in the Paris plant. Attractive radial corners, canopies, glass blocks feature front, add to appearance and are functional. Within the plant, air-conditioning is basis of quality control and equipment operation.

New marshmallow maker features special mixing head, provides steady flow at point of use. It can also be used to mix cake batters, icings and egg whites, and to whip cream



IMPROVED Mixing Machine . . .

Better

By JOHN V. ZIEMBA,
Assistant Editor,
"Food Industries"

THE baking and confectionery industries can now produce an improved marshmallow continuously at the rate of approximately 1200 lb. per hr.

This is possible with an automatic mixer that employs a new mixing principle. The new machine was designed by the E. T. Oakes Corp., Douglaston, N. Y., to increase production and to make a product which is more uniform and of better quality than that produced by the batch method.

There are other advantages in the use of this mixer. It reduces the cost of labor and power. And the job of keeping plants sanitary is simplified. Further, less floor space is needed, since the number of machines required is reduced.

While the mixer was originally designed to make marshmallow, it can also be employed for many other purposes. It can be used to whip cream and to mix icings, egg whites, pound cake, sponge cake and coffee cake.

The first of the improved machines was installed in a Kroger bakery at Columbus, Ohio. Installation of the second was made in National Biscuit Co.'s New York City plant, and now the company has installed these mixers as standard equipment in many of its plants.

Many years were required to develop the new mixer. Numerous experimental machines were built, with various changes in the interior dimensional settings and in running curves on horsepower, production rates and heating effects.

Finally a machine was constructed which provided maximum production. It brought a saving in horsepower, for only about one-fifth the hp. required by the batch method is now necessary in making marshmallow or cake icings. Moreover, a cooling device is not needed on the mixing head because so little heat is developed during mixing.

How the Mixer Works

In making marshmallow, the new machine combines all of the ingredients *simultaneously* as they flow continuously through the small mixing head. This may be compared with the batch mixer, which *gradually* works a large quantity of ingredients together in a big beater.

Employing a new mixing principle, the machine incorporates a specially designed mixing head. Into this head there is continuously fed a controlled amount of air together with ingredients — sirup, gelatin and flavor. Air and ingredients unite just before entering the mixing chamber.

The mixing chamber is of 14-in. dia. and 2 in. deep, and it has two identical heads comprising front and back stators. Each head has eleven concentric rings of fixed blades. Between the heads is a rotor comprising eleven concentric rings of moving blades.

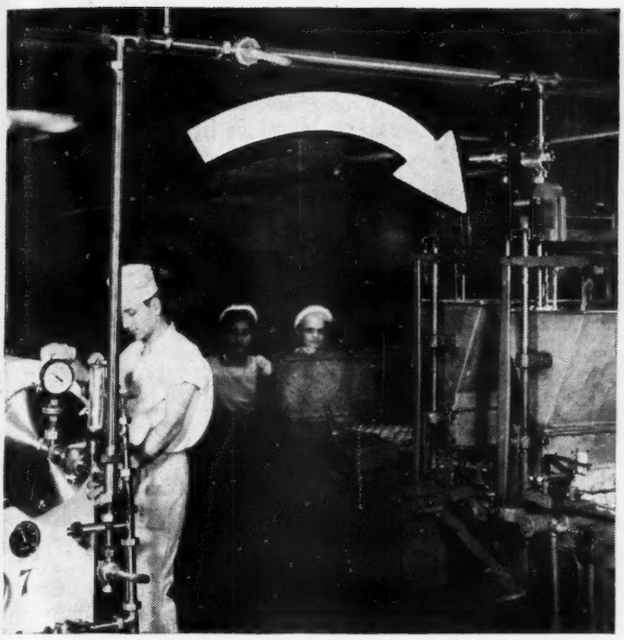
Compressed air and the ingredient mix are forced into the center of the back stator; toward the periphery of the rotor on one side; over to the other side of the rotor; and finally to the center of the front stator where marshmallow is then discharged.

Batch Mixing Compared

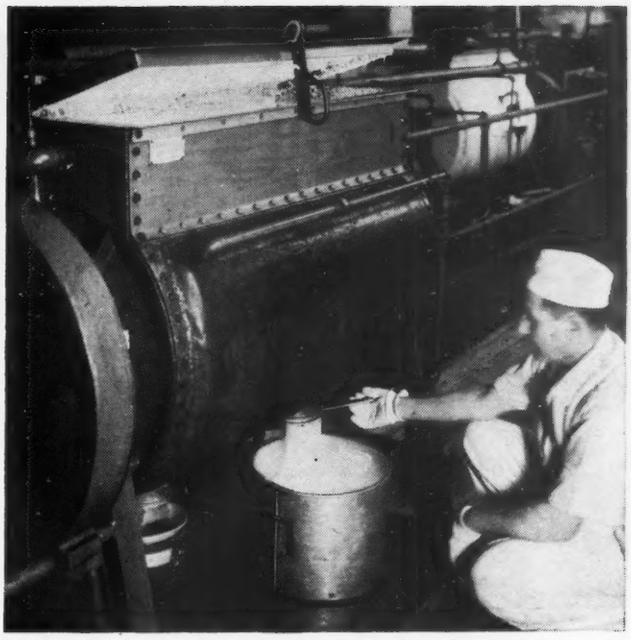
In contrast, making marshmallow by the batch method requires one or more operators to perform a number of operations. The success of these operations depends upon the accuracy and judgment of the operators.

Even skilled operators have found it difficult to keep each batch of marshmallow uniform: One batch may be satisfactory, the next may not. Occasionally operators mix a non-uniform batch which must be remixed. And, when this is done, machines and operators farther along the line must remain idle.

The power requirements are high with the batch method, since mixing is done with a mass of material, only a small part of which is being mixed.



. . . PIPES 'Mallow to Line . . .



. . . WHEREAS Old Model Made Batches

Marshmallow Faster

And the power demand is not uniform because the motors remain idle between batches. It is particularly noted that with the new continuous process, the peak power demand is lower, reducing power costs.

Other disadvantages of the batch method are high cleaning costs, the number of machines and receptacles required, and the large amount of floor space needed.

Accordingly, replacement of the batch method by a continuous process of making marshmallow involved seven objectives. E. T. Oakes, sought to design an automatic mixer that would:

1. Provide ample capacity to pace other machines on the line.
2. Improve quality by assuring a uniform, stable, tender and firm-textured marshmallow.
3. Reduce the amount of floor space required for the operations.
4. Conserve ingredients.
5. Reduce labor costs.
6. Meet the necessary sanitary requirements.
7. And reduce power demand and requirements.

Good Pace-Keeper

The capacity of the new continuous mixer is more than enough to keep pace with machines on a marshmallow cookie line. In fact, production has been increased to such an extent that one unit can keep four such lines in operation. Each line consists of a marshmallow depositor, chocolate enrober (or coconut depositor), and a packaging line.

Improved Quality

In marshmallow, quality is based on uniformity. By using the continuous mixer controlled by instruments, human-error factors are minimized and high quality is assured. To attain this goal, considerable attention was paid to the design and construction of the instruments and also to the instrument controls. It was primary that the controls give fully adequate range and be accurate and immediate in response, also be readily accessible and easily understood.

To be of good quality, marshmallow must also be stable, firm, tender and of the proper texture. Stability of marshmallow goods under varying shelf conditions is important. The products must not only retain their shape and texture under severe changes in climatic and weather conditions, but also under different modifications in formula required by consumer demands or economic conditions.

Heretofore, firmness had been obtained at the expense of tenderness. To obtain a firmer marshmallow, it had been necessary to use more gelatin — which made the 'mallow tougher.

With the new machine, however, mixing is so efficient that the amount of gelatin used is reduced about 25 percent. Furthermore, the marshmallow is superior to that made by the batch method because it is smoother. It is also so stable that it can withstand unfavorable shelf conditions. And it is so firm that the skinning table can be reduced or even eliminated, while the product is so uniform that there are no overweight losses.

Floor Space

The new mixer reduces floor space materially, not only because the machine itself takes up less space but also because it eliminates many machines and receptacles. It also saves space formerly required for transporting the raw materials and marshmallow. In addition, floor space is saved by the aforementioned reduction in size, or actual elimination of the skinning tables.

Reduction of Labor

Moreover, labor costs are reduced. Once the controls are set, there is nothing more to do until it is necessary to shut off the machine or to change to a different type of product. In addition, flow adjustments formerly made on the marshmallow deposit machine are eliminated because of the uniform nature of the product.

The amount of labor required for

From Plain Cookie to Finished Product

COOKIES Move Under Hopper, Get 'Mallow . . .

. . . NEXT Receive Topping—Either Coconut . . .

. . . OR Chocolate

clean-ups is also reduced. With the new mixer, it is easier to keep plants sanitary. There are no bowls, buckets, hand trucks or belts to wash. Cleaning the new mixer, when necessary, requires little time. No moving parts are exposed on the machine. Furthermore, the system is closed from the ingredient tank to the depositor on a marshmallow-cookie line.

Power Consumption Is Less

Requirements for power are both smoothed and reduced with the continuous mixer because a steady, small load replaces the intermittent heavy loads of batch mixing. In the latter method, the arms, blades, paddles or whips were often called upon to move huge masses of material in initiating a mixing process.

In the case of marshmallow, the whips or paddles of the batch machine must travel through the sirup fast enough to create a void in their wake. Air flows behind the whip or paddle. The sirup closes in above the air and entraps part of the air in the form of a large bubble. This large bubble must then be subdivided many times by the whips or the paddles before the marshmallow becomes stable.

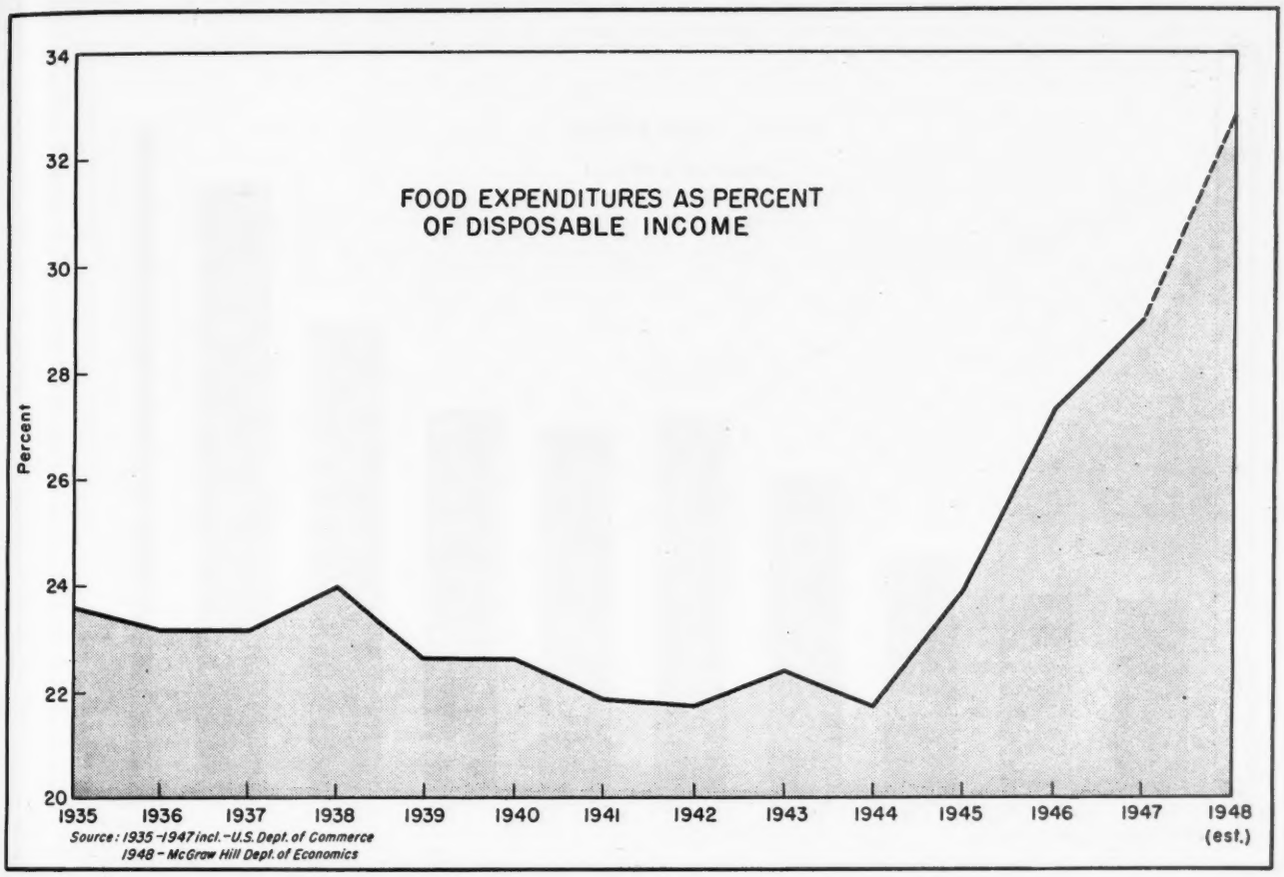
Furthermore, large air bubbles are constantly being added to the mix as long as mixing continues. Consequently, it is difficult to obtain uniform air cell structure by the batch mixing process.

Since the only point of access for the air is around the wire or paddle, only a small amount of the sirup is mixed in a given time. With the continuous mixer, however, the unit is designed to mix all ingredients simultaneously in the mixing chamber. This mixing is uniform because no unwanted, large-size air bubbles are formed—since in the new system compressed air and ingredients are metered together into the mixing chamber.

It has taken a long time to develop a continuous marshmallow mixer for the baking and confectionery industries. But efforts have been worth it; for the unit can bring to many mixing operations:

1. Better sanitation.
2. More uniform and higher quality marshmallow.
3. Reductions in labor and power.
4. Reductions in machines and equipment, and thereby in floor space, and
5. Better use of raw materials.

This should set the stage for greater sales through improved quality and lower costs.



People are spending more of their income on food

A Mid-Year Look at Sales

With Americans spending more and more for better quality foods, 1948 looms as the food industry's biggest year

By ROBERT P. ULIN, McGraw-Hill Department of Economics

AMERICANS have been spending more freely for food since the end of wartime controls than ever before. Not only are people making more money today, but they are spending an even larger share of their budgets on food.

Their cash registers tell food store men that sales have been high. In the first quarter they were 15 percent above a year ago. But what is really remarkable is that food sales have been rising faster than people's incomes.

Before the war, Americans never spent more than 24 percent of their "disposable personal income"—the money they have left after paying taxes—for food. During the war, food's share dropped to 22 percent. But in 1946 food expenditures took 27 percent. In 1947 they claimed 29 percent. This year they may take as much as 33 percent.

The sharpest part of this rise, moreover, took place in the eight months between August, 1947 and April, 1948. Food store sales, on a seasonally-adjusted basis, rose about 14 percent in this period, despite increased availability of other consumer goods. This confounded business forecasters, who expected resistance to high food prices.

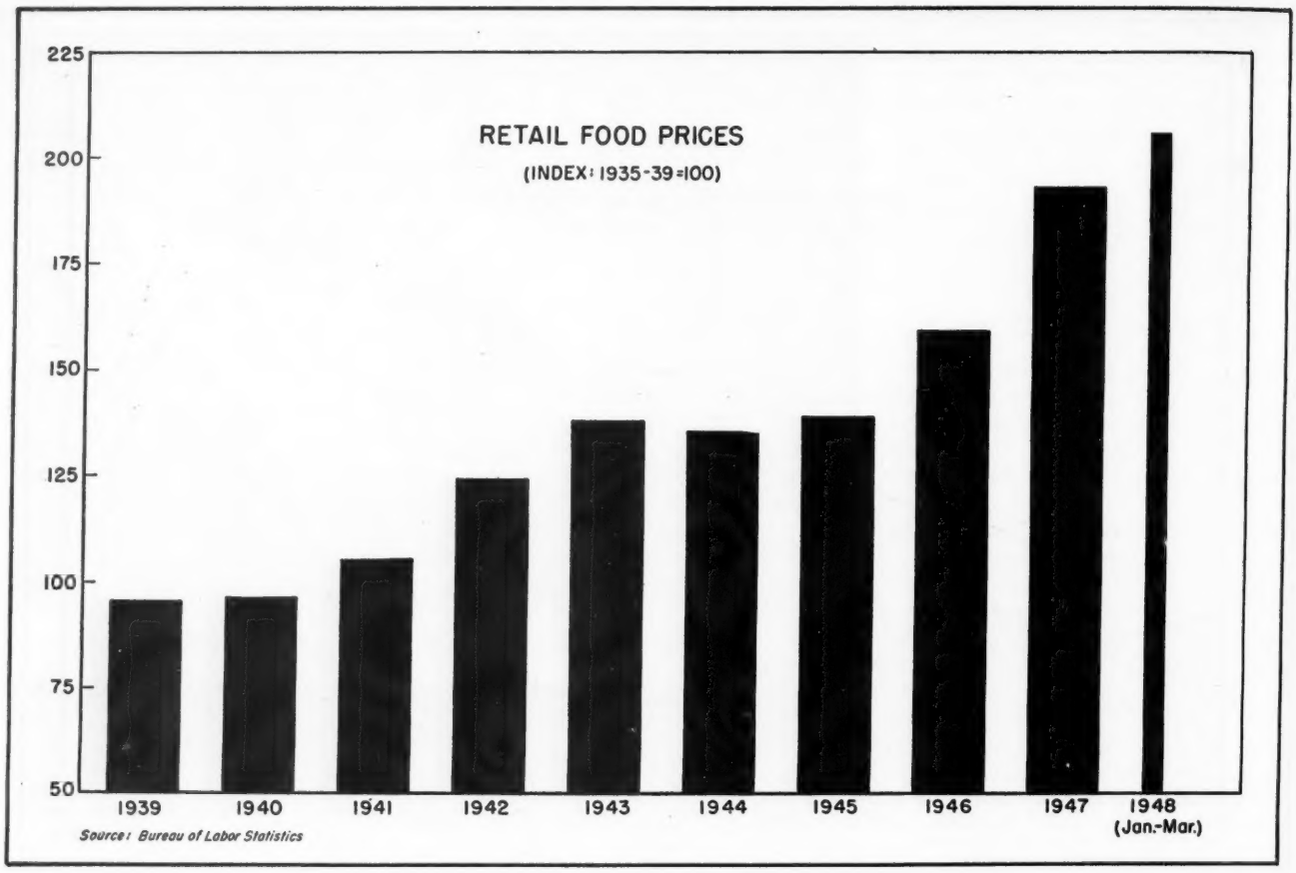
Food buyers did not resist last fall and winter, when the short corn crop and government buying for export forced food prices to new highs. Sales kept step with prices. In fact, the tonnage volume of food sold at retail was somewhat higher last winter than a year ago, according to A. C. Nielsen Co. surveys.

It seems clear that full employment has raised the standard of American nutrition. Evidently for example, the 2,500,000 families, who have raised their incomes above the $3,000 level in the last year, are not going back to their old diets. And factory workers, with incomes double 1939, intend to eat a lot better. While the groups who have raised their incomes also want new cars and better housing, the trend in food spending indicates that the first call on incomes is to maintain quality on the family dinner table.

Sales Outlook Bright

The new nutrition standards, coupled with the good general business prospect, make the food industry's outlook bright.

Overall, the demand for both farm and factory products is enough to maintain high industrial activity and employment through 1948. Construction, both business and residential,



Consumers continue to buy foods at record prices . . .

is heading for new records. Although some industries may see their volume fall toward the year end, government spending for defense and European recovery will bolster business in the later months.

High business activity will keep personal incomes high—and is likely to increase them. Wage earners, who spend a large proportion of their incomes for food, will particularly benefit. Third round wage boosts will add 5 to 10 percent to their incomes. In addition, lower and middle bracket taxpayers will get the greatest benefit from the $5,000,000,000 cut in federal income taxes. Lower withholding taxes will increase their take-home pay.

This increased flow of food dollars will help sales of most food industries, although each has its peculiar marketing problems.

People are likely to spend the increases in their food budgets not for *more* food, but for *better quality* food. So the meat, dairy products, and fruit and vegetable divisions of the industry stand to benefit most.

Staple items, like bread, which are bought in about the same quantity in less prosperous times, may even see prices weaken. Grain products, particularly, may see demand decline toward the end of 1948 because foreign needs will be reduced and feed crops seem more adequate.

Price-wise, this is likely to mean declines for cereal products. But, despite the predictions of some pessimists, it should not mean a sharp reduction in total food expenditures. The pessimists have overlooked the rising curve of worker income and workers' demonstrated tendency to spend for better food. High expenditure for vegetable and livestock products should largely offset any decline in demand for cereal foods. Food sales may well remain close to current levels through 1948.

Of course, not all the dollars spent at retail will show up in food company sales. Transportation and storage costs and distributors' mark-ups, take a big slice of the consumer dollar. However, the 15 percent rise over 1947 in first quarter retail food sales was paralleled by an 8 percent rise in manufacturers' shipments.

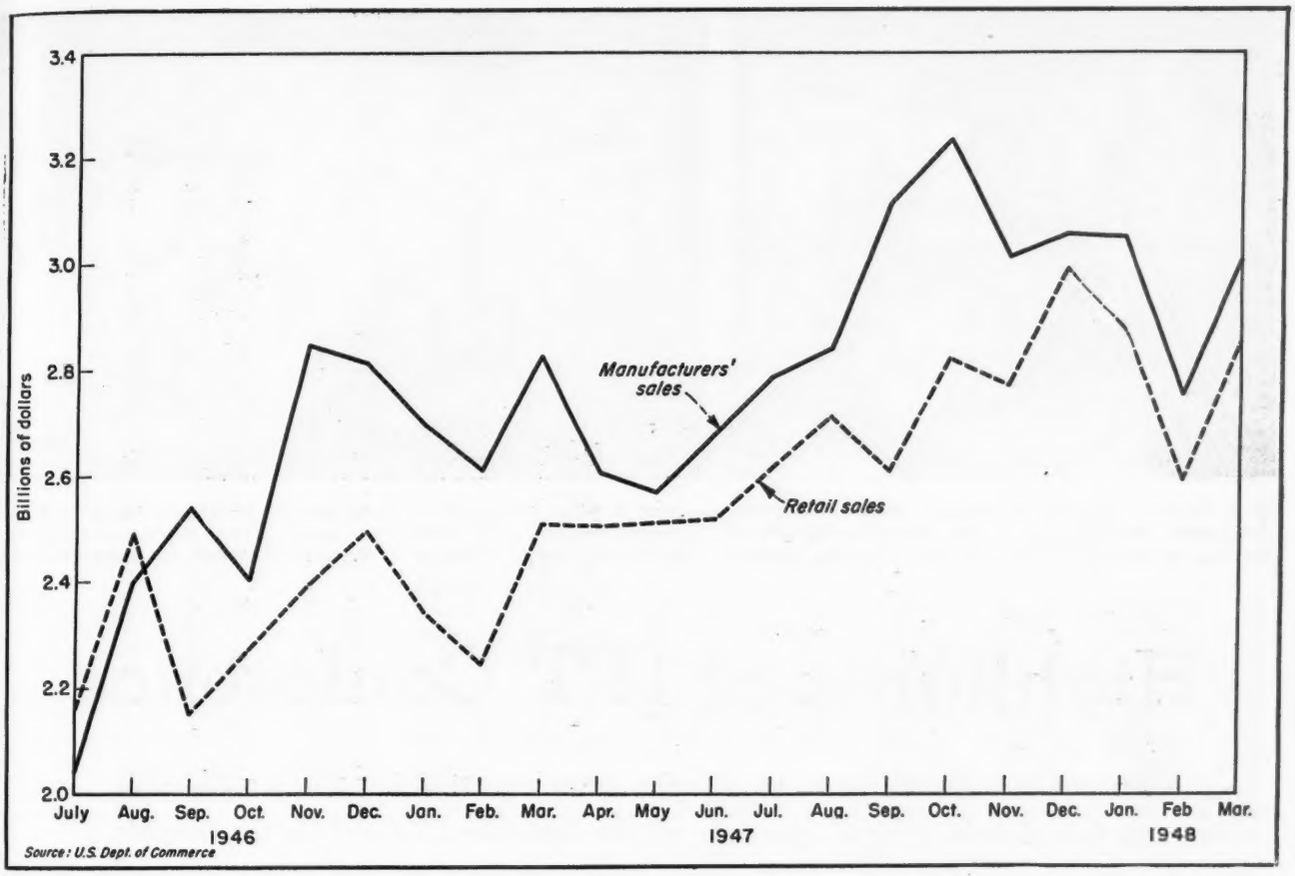
Inventories Conservative

Inventories of both distributors and manufacturers seem conservative today and should not hinder full production.

Sales volume for food processing companies depends more or less directly on retail demand, depending on the quantity of food already in distribution channels. From 25 to 50 percent of the items on retail grocery counters consist of canned or packaged goods that can be held in stock. Meat and dairy products are stored in cold storage warehouses. Consequently, inventories are a major component of the total food supply, and their size has a direct influence on manufacturers' shipments.

Fortunately food distributors' inventories are by no means excessive. According to the A. C. Nielsen Co. surveys, retail grocers' inventories, on a tonnage basis, are slightly higher than a year ago. However, they are still less than 10 percent above the level of February, 1942, although tonnage sales have increased about 30 percent in the same period. Dollar inventories at retail have increased nearly 70 percent since 1942, but the ratio of stock to sales is still below typical prewar years. Leading branded foods are still frequently out of stock.

Wholesale grocers, on April 1, were carrying 8.1 weeks' supply of merchandise, about the same as in 1941 and only slightly above 1939. Wholesalers and chain store warehouses held stocks of canned foods on May 1, which totalled 14 percent below a year ago and little above prewar, although some specific items are heavily stocked. In general, therefore, distributors must continue to draw on food manufacturers.



. . . Booming Sales of food processors and distributors

Manufacturers' stocks at the beginning of this year were little higher than in 1941 in terms of pysical units, although the physical volume of production was up nearly 40 percent. Moreover, stocks of meat in cold storage warehouses have since been considerably reduced by withdrawals during the meat strike.

With demand high and inventories in balance, the food industry can concern itself with high production.

This, of course, depends on crops. In all fields except meat packing, output should be well maintained this year, as ample crops are expected to be available for processing. Here is a summary of Department of Agriculture forecasts:

Meat packing tonnage may be off about 10 percent to 14,600,000,000 lb. from the 16,200,000,000 lb. packed in 1947.

Since fluid milk consumption has remained high, less has been available for manufactured dairy products. Output of these products has been 4 percent below 1947 and cannot be expected to rise much before the year end.

Somewhat more grain should be available to millers this year, as better crops will alleviate the feed problem. Less wheat, especially, will be used for feed if we have a normal corn crop. Moreover, wheat exports in the coming year are expected to decline by 175,000,000 bu. Accordingly, wheat for civilian consumption may top 500,000,000 bu., or about 10,000,000 more than in 1947-8.

Vegetable packers can probably increase production over 1947. Acreage planted will be approximately the same, but with better yields likely, output should be somewhat larger. Early indications are for fruit crops sufficient to maintain last year's processing level.

Ample sugar supplies will be available to makers of desserts, beverages and confectionery. Imports, plus available stocks, will provide as much sugar this year as in 1947.

A Look Ahead

This year may be the high point in food expenditures. Good harvests are expected, not only here, but abroad. Food exports are already declining, and by the fourth quarter may be running more than 30 percent below the 1947 average. An adequate corn crop this year will permit heavier feeding and better supplies of livestock products in 1949. Consequently, consumer prices should not be inflated, as they were this year, by wholesale premiums on grain for export and by the livestock shortage.

No sharp drop in food expenditures will take place while consumer income remains around current levels; demand is too strong. It should be remembered, however, that retail food prices are more than double their 1935-39 average, and in April were 10 percent higher than in 1947. A certain amount of this price inflation has been due to shortages for feed and export, so that next year the food industry could suffer some reduction in dollar sales, even if domestic eating habits remain unchanged.

Although sales volume does not face any drastic or immediate decline, the increasing prospect of lower sales in 1949 should cause food processors to redouble their efforts for efficiency. Operating costs in the food industry have risen to the point where profits per dollar of sales may not average over 3 cents in 1948, compared with 3.5 in 1947.

A drop in farm prices would lower raw material costs. Operating expenses, however, may hold close to present higher levels. Hourly wage rates are up 9 percent over last year. Freight rates have increased 21.5 percent since January, 1947. In this way the breakeven point for food manufacturers has been rising. Improved processes and more efficient use of existing equipment are both ways to hold it down.

E. J. Cameron, Director of research, National Canners Association, registers for the four-day conference, with the help of Alma McMurray, of the convention bureau.

Lloyd A. Hall, Griffith Labs; L. V. Burton, Packaging Institute; F. L. Seymour-Jones, Bordon Co.; S. D. Kirkpatrick, Food Industries; and J. G. Woodroof, Georgia Agricultural Experiment Station, do some chatting.

Highlights of IFT Conference

Recent developments in food technology reported to record gathering at the eighth annual meeting of the Institute of Food Technologists

THAT food technology has developed into a profession of great importance to the American food industry was demonstrated in Philadelphia, last month. The Eighth Annual Conference of the Institute of Food Technologists drew the largest attendance in its history when 1,017 registered for the four-day meeting, June 6 to 10. To this record-breaking gathering new knowledge in the many related sciences involved in food processing was presented in the 57 technical papers and two round-table discussions on the very extensive program.

Subjects ranging from baby foods to brewing were enlarged upon in the general sessions. In addition, official sessions, held concurrently, thoroughly explored the new technology of ion exchange, pectins, sterilization, food acceptance testing, frozen foods, control, and amino acids. There was something on the program of direct or indirect interest to practically every branch of the food industry.

Visitors from overseas gave the sessions an international aspect. Europe was represented by registrants from Sweden, Denmark, Germany and England. A group of Chinese technologists came from the University of Nanking. And there was, of course, the usual attendance from the Canadian food industry.

The conference opened on Sunday evening with a combined scientific and social program. One general session was held on Monday, with sectional programs following. Resumes of the papers follow here.

Color Changes Discussed

Round table discussion on color changes in foods was led by Professor M. A. Joslyn, University of California. Reviewing enzymic and non-enzymic changes in color, the discussion leader showed how increasing biochemical knowledge is explaining commonly observed color changes and is paving the way for rational control of them.

Color changes — important in meat, fish, fruits, vegetables—are of at least three types, according to Dr. Joslyn. There may be changes in the natural pigments, due to change in the physical state or chemical reactivity of the pigments. Or, there may be a reaction between the pigments and the environment. Oxidative or non-oxidative changes in other constituents, particularly carbohydrates and related compounds, may occur. These may be both enzymic and non-enzymic.

Green pigmentation of vegetables, involving chlorophyll, was given as probably the commonest color system. Red or blue pigmentation in fruits, involving the anthocyanins, introduces another and different pigment system.

Chemistry of Chlorophyll

"The tendency in previous research has been to pay too much attention to the photosynthetic activity of chlorophyll, too little to its chemistry. But we have learned that browning of chlorophyll-containing materials is usually due to the simple replacement of magnesium by hydrogen, in the porphyrin nucleus. But though this change may be formulated simply, it is actually very complex.

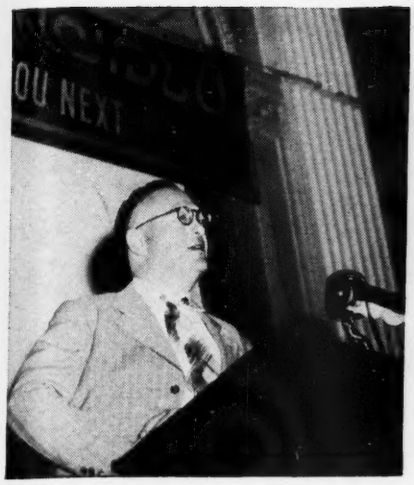
"Chlorophyll can be converted into more stable green forms by means of the enzyme chlorophyllase—which comes into play in low temperature blanching of spinach."

Canned peas were cited as a product with room for further improvement on the color score. "We need to widen our knowledge of the chlorophyll system in peas, which differs from that in spinach."

Retaining Red Pigment

Retention of water soluble red pigment is important in dealing with wine, grape juice, canned berries, cherries. Here again, chemical information about the pigment is needed, rather than wider botanical or physiological knowledge.

"The most stable anthocyanin pig-



The Technical sessions get off to a flying start as M. A. Joslyn, University of California, leads Sunday night discussion.

LeRoy Voris, National Research Council; Col. C. S. Lawrence, CO, Quartermaster Food and Container Institute; G. J. Hucker, IFT president; James McGowan, Jr., president, Campbell Soup Co.; Dr. Rufus S. Reeves, Philadelphia, E. E. Meschter, local chairman.

ment is the fully methoxylated glucoside," said Dr. Joslyn. This information is used in wine making, where sulphur dioxide and natural tannic acid stabilize the anthocyanin pigment against oxidative deterioration. There is evidence that hydrolysis precedes precipitation of this pigment.

As a different example of enzymic processes, the speaker cited discoloration of apple tissue, where it has been found that browning is not apparent until the ascorbic acid level is reduced to zero by the phenolase enzymes, which are capable of removing the ascorbic acid completely.

Turning to the non-enzymic discoloration, the speaker deplored a tendency to place all such effects in the non-enzymatic Maillard reaction category, with the possible neglect of other reactions.

Enzymes and Browning

Enzymic effects were tied in directly with browning in at least one instance. The product resulting from primary oxidation of ascorbic acid has been prepared in reasonably pure crystalline form. It is a highly reactive carbohydrate conjugating with amino acids. Thus Dr. Joslyn established a bridge between enzyme action in tissue and "non-enzymatic" browning. He issued a plea to industrial laboratories for the release and pooling of all such information which may have been held in confidential company files.

Knowledge of the browning problem was summed up by Dr. Joslyn as being in a state where some fundamentals have been established, with the result that work can now progress more rapidly. It is now recognized that several types of reactions may be involved, depending on pH, temperature and concentration which affect rate and type of reaction. In acid foods carbohydrate dehydration is of primary importance, in neutral foods the amino acid-sugar reaction may predominate and in the alkaline foods carbohydrate derivatives.

Need Emergency Program

Col. Charles S. Lawrence, commanding officer, Quartermaster Food and Container Institute, told of the plans now being developed for the effective utilization of scientific and technological personnel in the food and container industries, in the event of a national emergency. One of the great handicaps throughout World War II, Colonel Lawrence said, was lack of a training program for technical men. Nor were technologists utilized as they should have been. Out of each 100 technical men in the last war, 30 were fully utilized, 33 about half utilized, while the balance were in a position to contribute nothing of their technical training.

Now is the time to develop a program, the Colonel continued. An atomic attack could spoil food materials in a large area. In that event the food producer will have to be concerned with the feeding of both the armed forces and civilian population, particularly those in the path of attack. To that end also, rations must now be developed that are stable, acceptable and nutritious. He outlined the scope of the inactive duty assignments to be given reserve officers in the Organized Reserve Research and Development Groups for training during peacetime.

Poultry Processing

Conversion of a live chicken to the finished frozen state is best accomplished by either of two methods

International exchange: Georg Borgstrom, manager of the Swedish Institute for food preservation research, is greeted by Aksel G. Olsen, General Foods Corp.

in the opinion of T. H. Ramsey, poultry division, Birds Eye-Snider. Where evisceration and freezing are done in the same plant, the operation can be carried through without interruption. Where evisceration is done in a separate plant, however, the eviscerated poultry should be frozen in bulk. It is later thawed sufficiently for packaging, after which it is refrozen. This second method, Mr. Ramsey thought, was worthy of further serious study.

Stale Goods Problem

The importance of controlled distribution, supported by quality production and systematic laboratory control in maintaining quality of bakery products, was emphasized by Fred R. Pierce, general sales manager, Tasty Baking Co. By making use of the "hard-to-get" psychology and convincing dealers that the route salesman is best fitted to control the supply to the store, it has been possible, over a period of 30 years, to eliminate returns. Stale goods are

Institute leaders, past and present, are joined by the ladies . . .

At the banquet speakers table were: F. C. Blanck, H. J. Heinz Co., Babcock Award recipient; S. C. Prescott; E. E. Meschter; Mrs. L. V. Burton; Mrs. C. R. Fellers; President-Elect H. C. Diehl, Refrigeration Research Foundation; President Hucker.

destroyed in the store. These stales, however, are kept to a minimum by rigid adherence to "short selling."

Pectin Standardization

Methods by which pectins may be standardized were explored at a full session, in which W. A. Bender, General Foods' Central Laboratories, suggested a standard of jelly strength, 60.7 g./cm.^{2} of cap surface—as determined by the breaking strength of slices of the jelly by the Tarr-Baker test. He said that the strength of pectin jellies, determined this way, is in linear relation to the amount of pectin in jellies with the same pH and solids content.

G. L. Baker and C. W. Woodmansee, University of Delaware Agriculture Experiment Station, showed, by a comparison of grading methods, that emphasis should be placed on the preparation of test jellies instead of upon the testing instrument. When salt was omitted from the test gel, breaking strength measurements of gels, made with acid present during cooking, were found satisfactory for determining the standard jelly. With acid added in the glass, measurements were unsatisfactory. When a synthetic juice and buffer salt were used, test gels could be measured with either a breaking strength device, or a device for measuring sag for standardization, provided the proper correlation factor was used. Grading of pectin, they concluded, at the optimum pH of gelatin, when gels are prepared by boiling with acid, gives results in close agreement with those obtained when pectin is used in the factory.

W. A. Rooker, National Fruit Products Co., described the apparatus used by his company to determine the degree of jelly firmness. The Tarr jelly tester was used, but with several modifications: 1. A larger accumulator than the one supplied with the apparatus. 2. A water feed tank with an overflow so arranged as to give a constant pressure on the water feeder into the pressure accumulator. 3. A plunger slightly smaller than the standard plunger. Experience within his company, he added, indicated that the grade of apple pectin cannot be accurately determined by using the sag of test jellies.

Jelly firmness was the factor selected by the California Fruit Growers Exchange as most important to the preserver, according to Glenn H. Joseph. The instrument found most uniform and precise for measuring jelly strength, or firmness, was the Exchange Ridgelimater, a modification of the Lockwood-Hayes instrument. This instrument measures the deformation due to the compressive stress of the jellies own weight.

Soil Treatment

Jackson B. Hester, Campbell Soup Co., told of the effects of soil treatment on the quality of some foods. Use of excessive nitrogen fertilizer, for instance, decreases the vitamin C content of many vegetables. It also produces vegetables that are soft and that do not remain edible for any length of time.

Aromatizing Beer

According to Benno Lowy, Pacific Chemical Laboratories, beer-soluble hop oils are the best aromatizing ingredients for beer that lacks flavor. To preserve their delicate aroma, hops are steam distilled and the distillate refined by alcohol. By emulsifying the hop oil so that the aroma-containing part is not affected, a beer-soluble oil is obtained. This oil can be added to the cold storage beer. The process prevents loss of aroma, 80 percent of which will be volatilized if the distillate is added to the hot wort.

Session on Control

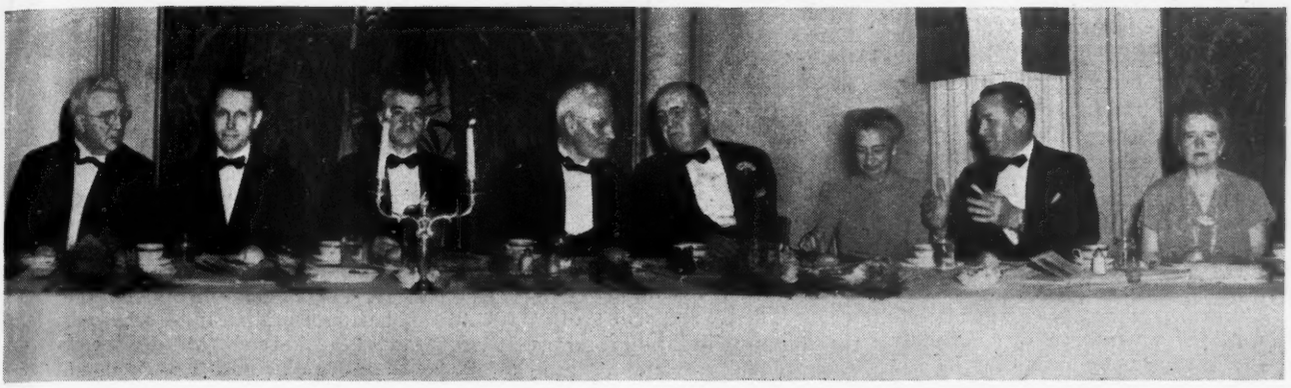
Statistical methods as applied to filling containers in the food industry were described by Marjorie L. Sutherland. By using these methods, Dr. Sutherland said, much closer control of filling can be obtained and losses from overfilling reduced to a minimum. Her talk was illustrated to show range and average charts as developed in agriculture. These charts were developed to show the accuracy of returns on the given number of tests. The minimum number of samples necessary to obtain the limits used were worked out so that costs of such control would not be excessive.

The electron microscope is being used full time in General Foods' physical chemistry laboratory, according to its director, A. C. Shuman. This microscope has greatly extended the particle size range to be studied. Slides used to illustrate the talk carried a micron scale to show relative sizes. The electron, he said, was particularly well adapted for use in the study of gelatin, pectin, animal tissue and other materials of very small granules.

Control instruments have made possible reduction in the size of processing equipment, while greater quantities of much higher quality foods are being produced, declared Lloyd Slater, Brown Instrument Co. He cited instruments for controlling pH, density, specific gravity, humidity, electrical conductivity and color as important additions to the original list, which controlled temperature, pressure, flow and liquid level. Materials used in instrument construction, the speaker noted, have an important bearing on its timing and accuracy.

Warren J. Hewes, Capitol Chemical Co., emphasized the importance of supervision in the use of insecti-

. . . in the social highpoint of the 1948 IFT conference program



E. S. Stateler, chairman, Chicago Section; Conrad Elvehjem, Appert Award Medalist; C. R. Fellers, IFT secretary-treasurer; L. V. Burton, Packaging Institute; James McGowan, Jr.; Mrs. G. H. Hucker; B. E. Proctor, M. I. T., and Mrs. F. C. Blanck.

cides in the food plant. Selection, application and precautions are the prime requisites in this operation and if such knowledge is not available within the company, professional help should be called in.

Fresh fish or meats make the most effective bait for rats, in the opinion of John W. Quinn, Capitol Chemical Co. Mixed with the proper proportion of poison materials, the bait should be placed close to walls and along runways. Control, he said, is a constant task in which baits must be rotated and traps kept clean.

Precautions for handling methyl bromide were offered by F. W. Fletcher, Dow Chemical Co. This gas, used as a fumigant in buildings, is very active. He recommended the use of masks, as prescribed by the U. S. bureau of mines, with limited time for cannister use. The work, he said, should be well planned and properly scheduled and should proceed from the upper floors down to the ground level exit. Crews should be composed of not less than two men.

Fish Technology

The seminar on technical fisheries education reached the conclusion that a full course in fish technology is not practical. It was the consensus of the meeting that courses in fish technology should be made a part of the major food technology curriculum. Major operations in a fish plant, it was pointed out, such as canning, freezing and curing, are similar to those in operation in other types of food plants. But short courses in fish technology for the practical men, such as foremen and superintendents, were strongly urged.

Nutritionist Honored

For oustanding discoveries in nutrition, Dr. Conrad A. Elvehjem, professor of biochemistry at the University of Wisconsin, received the Nicholas Appert Medal Award at the IFT dinner. This award is given each year by the Chicago Section in recognition of achievement in food technology. Dr. Elvehjem's work has been with vitamins and trace mineral elements.

Discusses Vitamins

In his acceptance speech, the Medalist reviewed the part which food technologists have played in advances leading to the modern conception of better nutrition for all. He also indicated some of the problems which will be encountered in future developments.

The nutritionist, he said, must never forget that adequate nutrition can be obtained only through a variety of appetizing and appealing food products.

Great progress has been made, Dr. Elvehjem observed, in the perfection of simple methods for the estimation of most of the known vitamins. But there still are many problems where these methods are applied to fresh or processed foods. In most cases each vitamin is present in more than one form. Vitamin B_6 activity may be due to pyridoxine, pyridoxal, or pyridoxamine. Each of these has the same physiological activity after entering the blood stream, but they differ considerably in their stability even when taken into the digestive tract. Folic acid or pteryol triglutamic acid may exist in several conjugated forms. These compounds may differ not only in stability but in physiological activity. While vitamin C and folic acid are lost when vegetables stand at room temperature, other elements, such as biotin, may be liberated and become more available during food processing.

While Dr. Elvehjem does not advocate the general use of synthetic vitamins, he agrees with the attitude of the Council on Foods and Nutrition of the American Medical Association. The Council wishes to encourage efforts to improve the nutritive quality of all foods which contribute importantly to the diet. In spite of these efforts, however, there undoubtedly will be, for some time, certain specific deficiencies in large segments of the population. And these can be remedied best through addition of indicated nutrients to cheap staple foods. However, the addition of synthetics to natural foods must depend on the prevention of known deficiencies in groups of the population and not on the utilization of synthetic products which happen to be available at low cost. The Council disapproves of unlimited or indiscriminate fortification of general purpose foods.

Food processors have done an excellent job in improving the nutritional value of some foods, Dr. Elvehjem said. However, it is apparent that greater progress could be made in certain areas, iodized salt being an example. And much can be done to improve the quality of diets in many areas through the manufacture of food mixtures.

There is a need for a great deal more work on protein and amino acid requirements, the Medalist observed. When such information is available, the effect of food processing on the protein part of the diet can be carefully studied.

The possibilities for improving the nutritional value of foods are tremendous. Dr. Elvehjem believes.

Dr. Blanck Receives Award

Fred C. Blanck was honored at the Conference luncheon for his outstanding contributions to the field of food technology — contributions which influence public health through more nutritious food. He received the first Stephen M. Babcock Award

— $1,000 and a certificate — made available through an annual grant by Nutrition Foundation, Inc.

Dr. Blanck is Administrative Fellow of the H. J. Heinz Fellowship at Mellon Institute. A past president of the IFT, he has been in the field of food technology for 40 years. In his acceptance speech, Dr. Blanck gave to the young technologists these pointers on how to develop themselves:

1. Never stop your professional education.
2. Develop a cooperative attitude toward fellow workers.
3. Broaden your scientific horizon so that you may visualize all the problems involved in your work.
4. Develop your power of expressions—to make clear, concise reports on your work.
5. Recognize that you are an integral part of the unit with which you are associated. Teamwork is essential.
6. Do not be dogmatic. Your fellow workers also have good ideas.
7. Do not hesitate to say, "I don't know." Bluffing has no place in a profession.
8. Be an attentive listener. Ask sound questions and absorb the answers.
9. Develop the ability to give adequate verbal expression to your ideas.
10. Take a healthy interest in the extra-curricular activities in your community.
11. Study individuals to determine their strong and weak points. It is important to develop a practical knowledge of human psychology.
12. Never overlook an opportunity to improve your professional equipment.
13. Develop the ability to sell yourself and your work.

Resumes of other technical sessions will appear in the August issue of Food Industries. Among these additional reports will be papers presented on ion exchange, amino acids and food acceptance testing.—The Editors.

ANNOUNCING 1949 COMPETITION—

FOOD INDUSTRIES AWARD—

For Achievement in Food Technology

FOOD INDUSTRIES announces plans for the Second Biennial Award for Achievement in Food Technology, to be presented at the San Francisco Convention of the Institute of Food Technologists in 1949. The award will go to the company in the food industries which, in the opinion of the Jury of the Award, has made the most outstanding achievement in Food Technology under the terms set forth by the donor.

The award is to a company, not to an individual. Its purpose is to encourage food processors to develop or adopt improved processes. The company winning the award will be selected by a jury consisting of professors of Food Technology in American universities. The jury will be appointed by the Institute of Food Technologists.

Conditions of the award follow:

1. The award is for an improved or novel process of food manufacture — not for a food product itself.
2. The process must have been in commercial use prior to the granting of the award.
3. To be eligible, the process shall have been put into commercial operation subsequent to V-E Day (May 8, 1945).
4. The process may be in any branch of the food processing industry.
5. Nominations for the award may be made by anyone, including employees of the company concerned.
6. The Editor of FOOD INDUSTRIES will act as Secretary of the Jury of the Award and will receive all nominations for transmittal to the Jury.
7. The I.F.T. will appoint the Chairman of the Jury, who will act as spokesman for the Jury at the time the award is granted.
8. The award will be presented to the winning company at the San Francisco meeting of I.F.T. in 1949.
9. Any company which entered a process in the 1947 competition continues to be eligible to enter the 1949 competition with the same process.
10. Evidence of a character that will permit the Jury to evaluate the technological progress must be submitted by the company to the Jury through the Secretary of the Jury—the Editor of FOOD INDUSTRIES.

Please note carefully: This award is for technological achievement in the form of a manufacturing process. It will be evaluated by professors of Food Technology—not by lay persons. The best evidence a company can produce is a technical description of the process, accompanied by a flow diagram and photographs and including an explanation of the following:

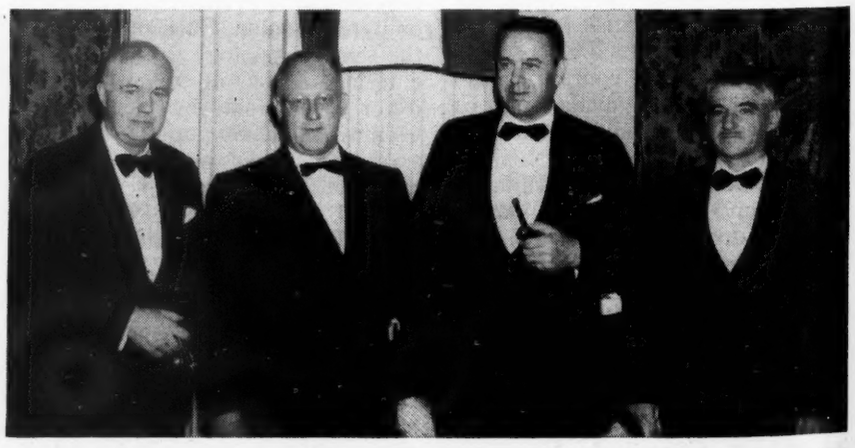
How it came to be developed.

The steps by which it was developed.

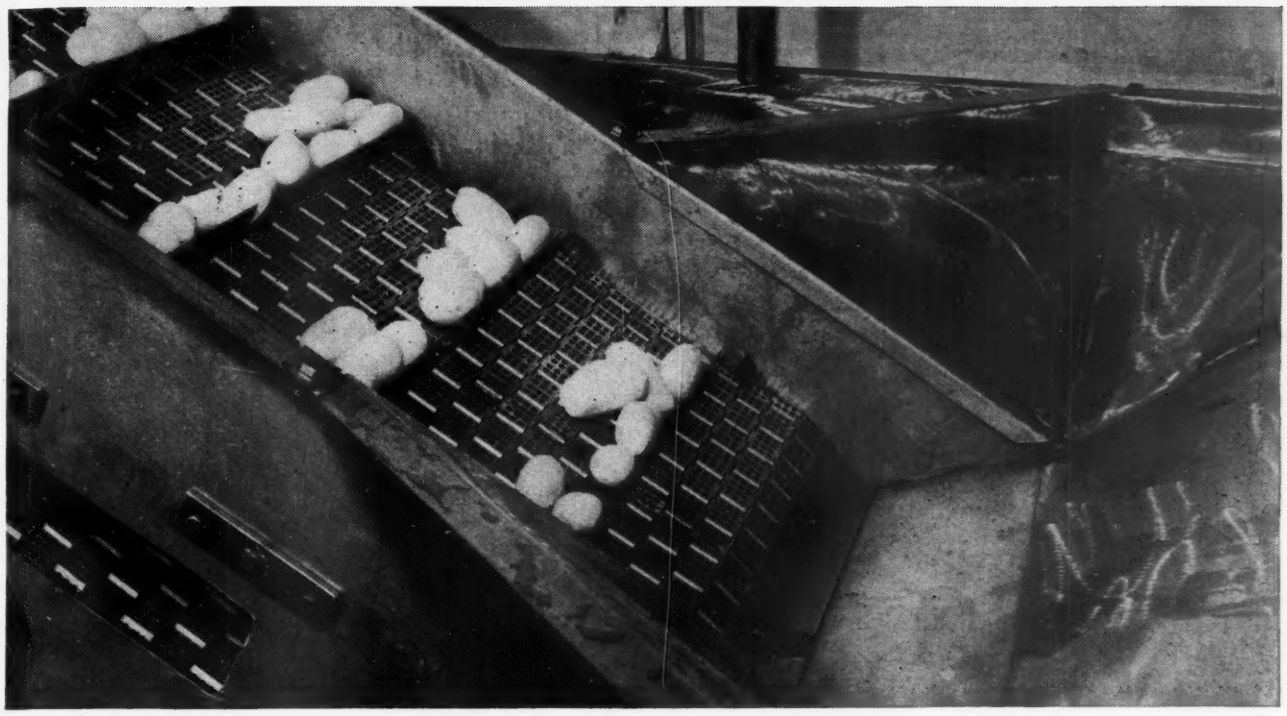
The success, technological or economic, which it has achieved.

11. All entries must be in the hands of the Secretary of the Jury by January 1, 1949, to be eligible for the 1949 competition.

President Hucker presents scroll of first IFT Babcock Award to F. C. Blanck.



Retiring President, G. J. Hucker, at left, poses with President-Elect H. C. Diehl, newly elected Vice-President B. E. Proctor and Secretary-Treasurer C. R. Fellers.



Pre-Peeled Potatoes From Mechanized Line

New service supplies ready-to-cook potatoes which will hold their natural color, saving restaurants labor and space, curbing waste

By C. R. HAVIGHORST, Associate Editor, "Food Industries"

TO provide restaurants with potatoes at significant savings—in labor, space and product—a mechanized production line has now been developed which both peels the tubers and treats them to prevent discoloration.

Natural-color ready-to-cook potatoes are supplied in commercial quantities, under the trade name "Pre-Pared," by Western Food Service, Inc., the first licensed plant to begin operations with this process. Tubers are washed, peeled, trimmed, plasmolyzed and treated to retain their natural color. Equipment for these operations is made by Food Machinery Corp.

Losses as high as 46 percent result, according to a recent survey, from manual and some abrasive peeling and trimming operations in restaurants. However, during the season when best quality potatoes are available, losses run as low as 20-30 percent in some restaurants.

Pre-Pared potatoes in 60-lb. sacks sell for the same price as 100 lb. of unpeeled, good quality potatoes. Because of this uniform price arrangement, plus the savings in labor and space, the product is receiving favorable response. Under proper refrigeration, the processed tubers may be held for five days, and with controlled temperature and humidity as long as ten days.

The Process

Potatoes are received at the plant in 100-lb. sacks. These are dumped, manually, onto a belt conveyor, which carries them to the sizing machine. An operator sorts out potatoes of uniform size and quality for sale as baking potatoes. This lot is washed but is then diverted from the line before processing. Baking potatoes are packaged in 60-lb. kraft bags.

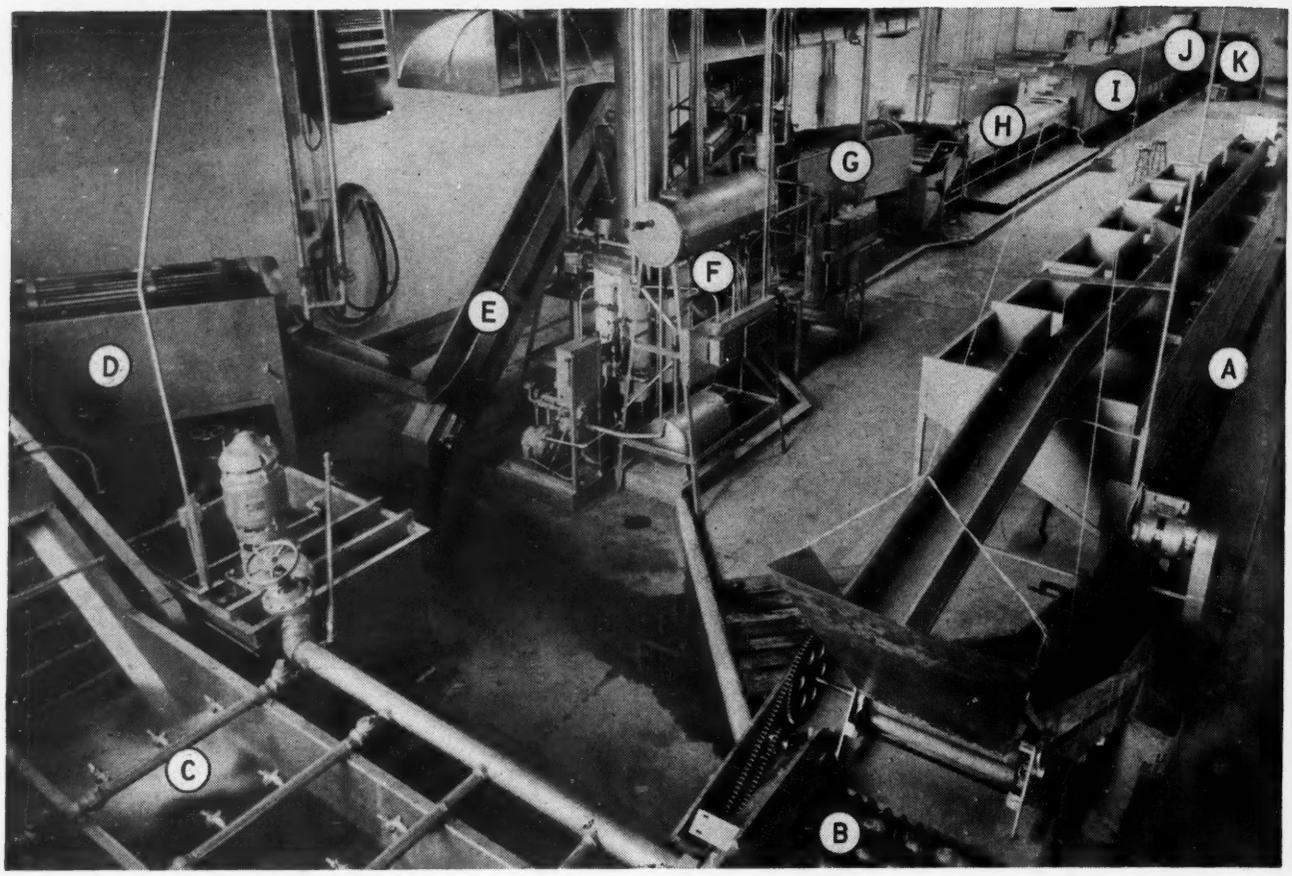
The potatoes are further sorted by the sizer into those for boiling and those for frying. They fall, according to size, through the interstices of a series of rotating rubber rollers. In the subsequent processing, these boiling and frying potatoes go through the same treatment but are processed separately.

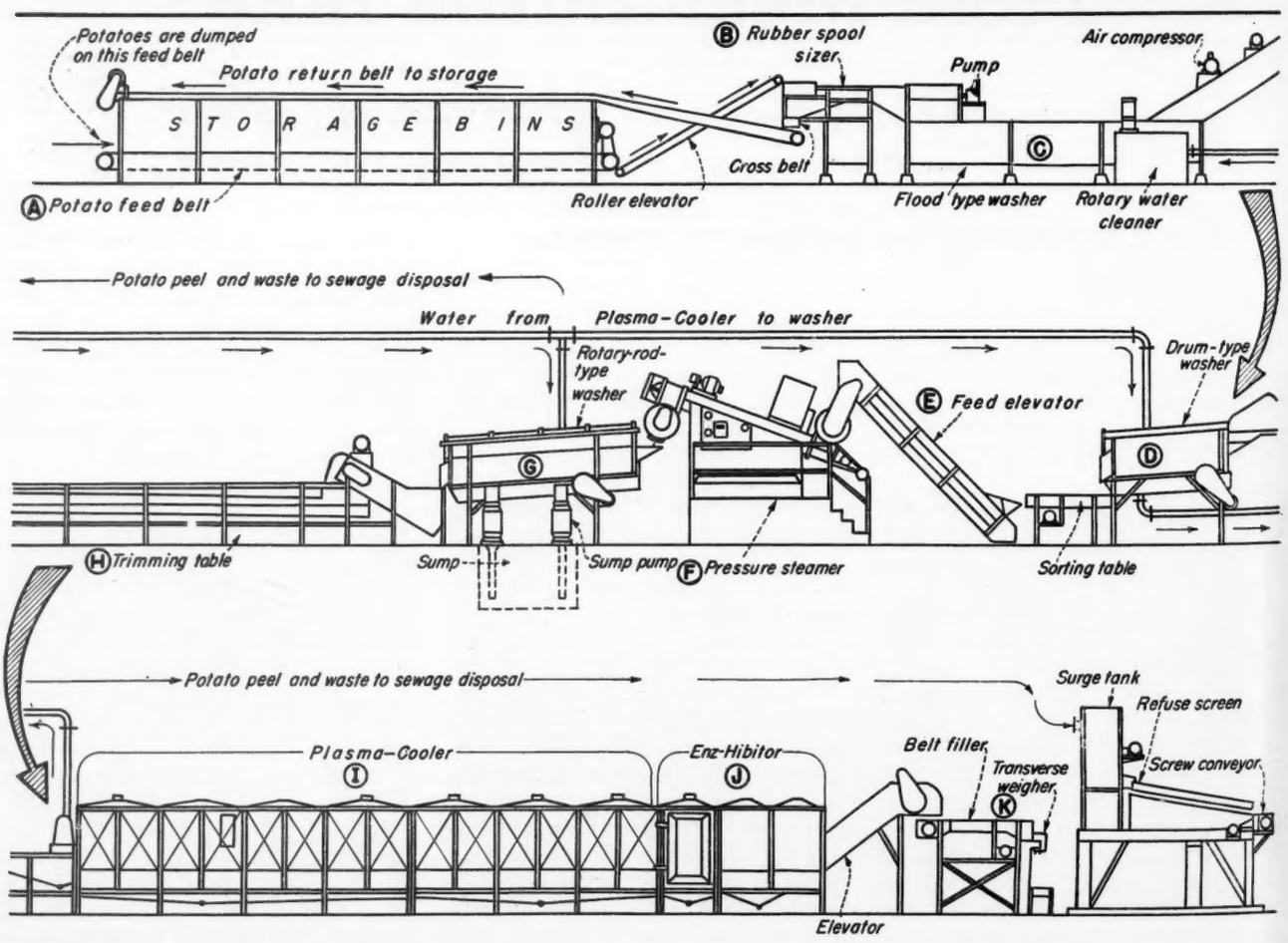
Preliminary Washing

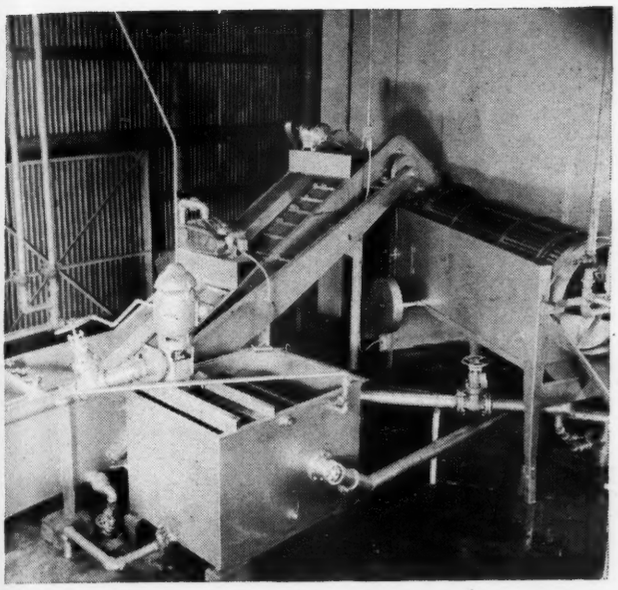
In the flood-type washer, potatoes are agitated, rubbing against each other by the action of compressed air pumped through perforated pipes under the floor screen. Further agitation and washing are accomplished with pressure sprays, located across the top of the washer. From this washer the potatoes are elevated by conveyor to a rotary drum-type washer for a final cleansing with sprays, aided by the friction of the tumbling action.

The potatoes pass from the drum-type washer across the sorting belt and are then elevated to the pressure steamer. This unit is a cylinder ap-

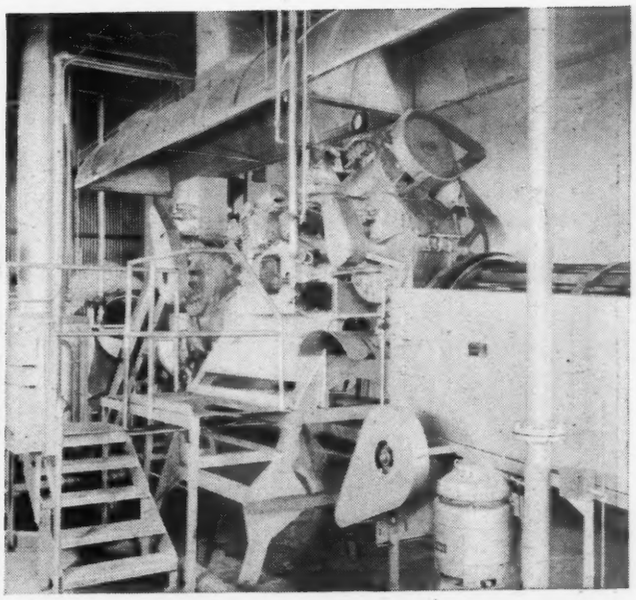
Full Production Line View and Schematic Layout



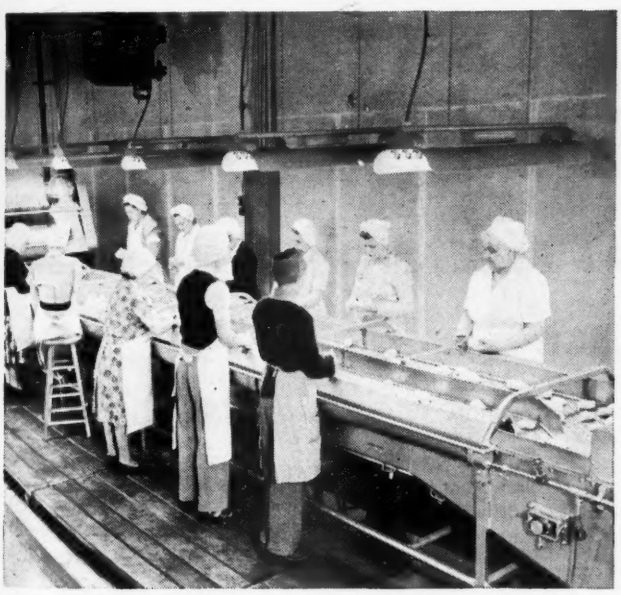




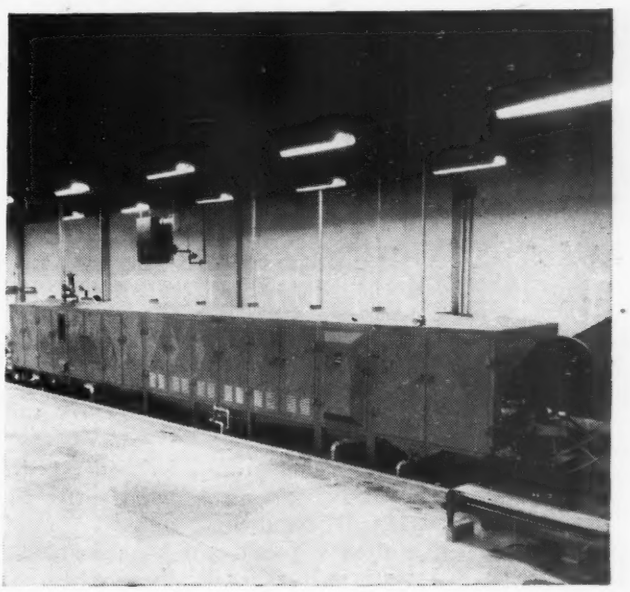
Potatoes are Thoroughly Washed . . .



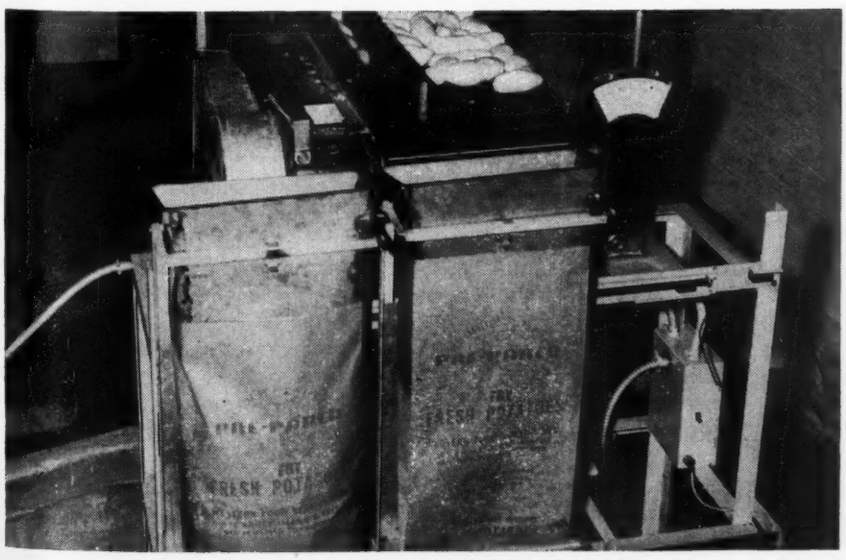
. . . And Skins Steamed Loose, Removed



Eyes and Defects are Trimmed . . .



. . . Then Treatment Prevents Discoloration

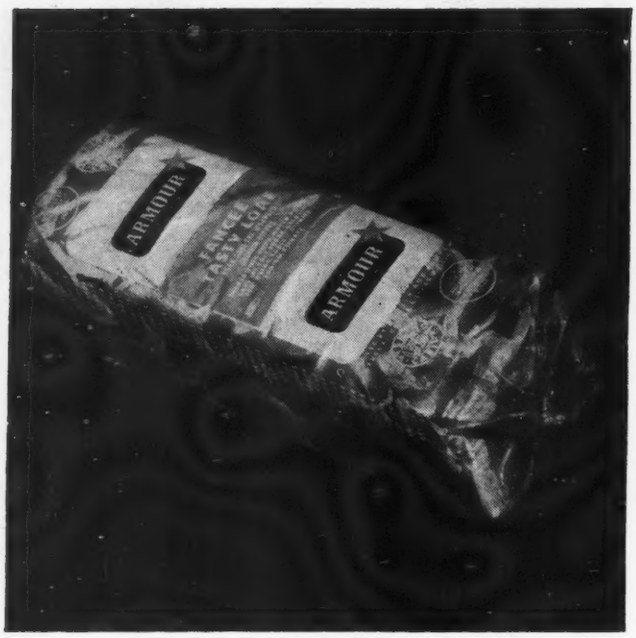


And Bagging and Weighing are Final Steps

proximately 12 ft. long and of 14 in. diameter. It is equipped with a variable speed drive, a ten-flight worm conveyor, and inlet and outlet valves through which the potatoes enter and leave the cylinder. The conveyor leading to the inlet valve is synchronized with the valve operation. Each inlet valve pocket delivers approximately 6 lb. of potatoes into the cylinder, and the worm conveyor pushes them forward.

The rotary, seven-pocket inlet and outlet valves (see p. 141, May 1945 FOOD INDUSTRIES) are specially designed for high-pressure operation. Steam pressure in the cylinder is maintained at 60 psi. Since the steam, if released to atmosphere, would be expelled noisily, water-jet condensers spray water into the exit valve

(*Continued on page 202*)



Meat Loaf Mold Is Curbed . . .

. . . Rindless Cheddar Made . . .

Versatile New

It clings to odd-shaped products, reducing air pockets and mold growth.

By RALPH SIGNER and F. WARREN TAUBER,
The Visking Corp., Chicago, Ill.

A NUMBER of promising properties have now been combined in a single packaging film, and this new wrapper has already found a wide variety of uses in the food industry.

Trademarked "Visten" by its maker, The Visking Corp., of Chicago, this film is a modified vinyl plastic product. It has ability to cling to irregular shaped foods, capability to resist deterioration, high degree of toughness, and selective permeability of various gases.

The "cling" of the film—giving close adherence to foods, particularly those which are non-uniform—has enabled elimination of air pockets, thereby inhibiting surface mold growth. Since the film contains no plasticizer, it cannot contaminate foods which it contacts, and since no reaction with foods takes place, it will not deteriorate.

Toughness and Permeability

In tensile strength, the film has a range of 3,000 to 4,000 lb. per sq. in., and in elongation before breaking the range is 250 to 350 percent. In general, this product is somewhat softer to the touch than most films.

As for behavior under sudden and sharp impact, samples of the film 1.75 mils thick sustained blows up to 200 in.-oz. per inch of tear, as measured by the General Electric puncture tester.

Another indication of its high degree of toughness is shown by the value of tear resistance, which is about 300 g. per mil of thickness. This represents the force required to continue an already initiated tear.

An important property of a food packaging film is its rate of transmission of moisture-vapor and various gases in the atmosphere. When tested by the General Foods moisture-vapor tester, the film showed a low permeability rate — approximately 7 g. per 100 sq. in. per mil of thickness during 24 hr. at 100 deg. F.

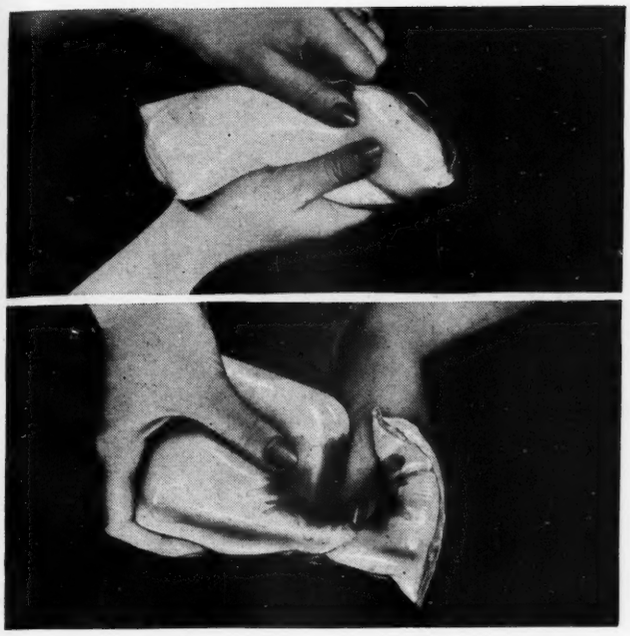
The passage of various gases through the new film, for 100 sq. in. per mil of film thickness in 24 hr., was found to be: (1) For oxygen, 45 cc., when measured by the Todd method; (2) for carbon dioxide, 380 cc., when measured by the same method; and (3) for nitrogen, 13.6 cc.

The transparency of the film (1.5 mils thick) is rated at 90 percent for light transmission in the visible range of spectrum. Surface gloss, although somewhat less than desirable in the immediate stages of development, has been improved along with printing ink acceptance, and the film now compares favorably in these respects with non-food wrappers. For the most part, the film is opaque to ultra-violet light.

Satisfactory Seals

From the packaging point of view, heat sealing temperatures are important. It has been found, however, that with Visten satisfactory seals can be made over a fairly wide range of temperatures, depending on the type of machine used, pressure, and other factors such as speed. A temperature of 250 deg. F. is generally recommended.

When the film is in direct contact with food, it transmits no off-odors or off-tastes to the food. Such products as meat, cheese, oleomargarine and pickles do not affect the film adversely on storage. The



... Margarine Readily Colored ...

... And Pickles Bagged in Brine With—

Packaging Film

Other features are toughness and low moisture-vapor transmission rate

film material has been accepted by the Meat Inspection Div. of the Production & Marketing Administration of the U. S. Department of Agriculture, which terms it suitable for direct contact with food.

Visten Tube for Liver Sausage

When using Visten tubing as an outerwrap for liver sausage, best results have been obtained after the sausage has been chilled in a refrigerator. The rigidity caused by chilling is of aid in the handling and stuffing operation.

The liver sausage emulsion is first packaged in the company's No. 30 Opaque "Visking" Casing (a cellulose product), following which a tube of Visten film measuring 4.25 to 4.50 in., flat width, is opened and slipped over the small end of a funnel shaped horn. Then the chilled liver sausage is slipped through a funnel cone and pushed into position in the tube. Finally, the enmeshed sausage and tube are separated from the horn, and closure of the tube is made by a string tie.

Liver sausage wrapped in this manner can be stored for several weeks with less than 0.1 percent loss in weight. Without the protective tube, the sausage may lose as much as 15 percent weight after two weeks' storage. Thuringer Cervelat, and other dry and semi-dry sausages, have been successfully overwrapped in Visten tubes.

Meat loaves have also been stuffed into the tubes, with the tubes subsequently sealed by heat or by string tying. These packages have lost less than 0.4 percent moisture after 30 days' storage at 40 deg. F.

The loaves were tested organoleptically and were in excellent condition. A large number of the loaves were even satisfactory after 60 days, which is greatly in excess of the usual holding practice for this type of product.

The new film was submitted to pilot plant production conditions. Organoleptic and bacteriological tests were made at production and storage levels comparable to the usual packing plant and retail storage conditions. The findings were consistent with those obtained by The Visking Corp. Laboratory.

For Wrapping Margarine

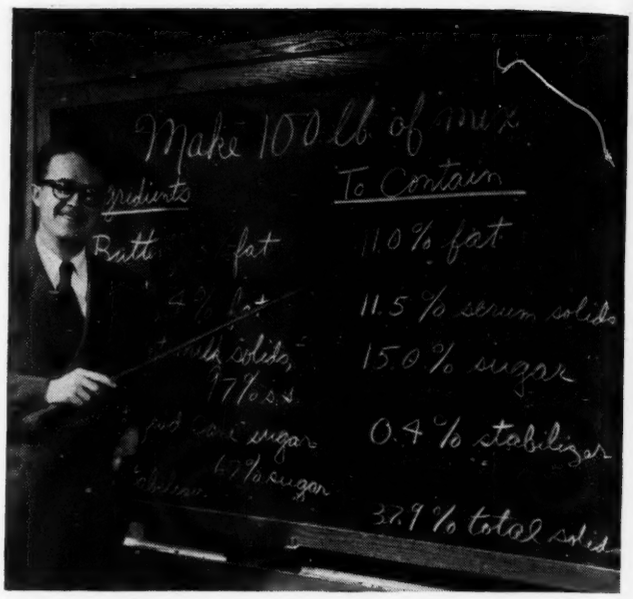
It was found that the new film was the best packaging material for the new oleomargarine application (U. S. Patent 2,347,640 issued to L. Peters) first used by The Cudahy Packing Co. Here, the margarine is sealed into a Visten bag with a color capsule. The consumer first releases the food dye by rupturing the capsule within the sealed container, then he works the color into the oleomargarine mass with a kneading

(*Continued on page* 201)

TABLE I—Properties of "Visten" Film

Tensile strength	3,000 to 4,000 lb./sq. in.
Elongation to break	250-350 percent
Impact resistance (General Electric puncture test)	200 in.-oz./inch
Tear resistance	300 g./mil
Moisture-vapor transmission (General Foods tester)	7 g./100 sq. in./mil/24 hr.
Oxygen transmission (Todd)	45 cc./100 sq. in./mil/24 hr.
Carbon dioxide transmission	380 cc./100 sq. in./mil/24 hr.
Nitrogen transmission	13.6 cc./100 sq. in./mil/24 hr.

Definite savings can be made in the cost of ice cream mixes when advantage is taken of the most economical milk solids and butterfat sources — which vary through the seasons. In explaining ways to make mixes of uniform quality from different ingredients, this article particularly demonstrates how . . .



Simple Arithmetic Cuts Ice Cream Mix Costs

By N. A. PERRY and C. D. DAHLE,
The Pennsylvania State College, State College, Pa.

FORWARD-looking ice cream manufacturers — especially those who practice routine testing — can realize considerable savings in ingredient costs by applying an easily learned method of calculation requiring only 15 to 20 min. for figuring.

They are thus enabled to change, precisely, from one raw material to another, when advisable because of relative costs or availability. By standardizing mixes, they are able to make a uniform product and keep close control over ingredient costs.

The difference between a 12 percent fat ice cream and one containing 12.5 percent is hardly discernible to the taste; yet this difference would account for 1,150 lb. of fat in 25,000 gal. of mix—and can easily happen where calculating and standardizing of mixes is not practiced.

Basis for the improved method of calculating ice cream mixes is the system devised by Thomas D. Cutler*, his computation being frequently known as the "serum point" method.** This article shows how, with altered calculations, Cutler's method may be applied to conditions existing today.

Two general formulas are used—one for finding the amount of condensed or dried milk, the other for determining the weight of the ingredient containing a high percentage of butterfat. These formulas follow:

$$1.\ \text{Lb. of cond.} = \frac{\text{lb. s.s. needed} - (\text{lb. serum in mix} \times 0.09)}{\text{lb. s.s. in 1 lb. cond.} - (\text{lb. serum in 1 lb. cond.} \times 0.09)}$$

$$2.\ \text{Lb. of concentrated fat ingredient} = \frac{\text{lb. fat needed} - (\text{lb. milk \& cream} \times \text{lb. fat in 1 lb. of milk})}{\text{lb. fat in 1 lb. of concentrated fat ingredient} - (\text{lb. fat in 1 lb. milk})^{***}}$$

Cream containing added sugar requires a slightly altered formula if it is used as the sole source of extra butterfat and will be treated as a special problem.

Calculating Commonly Used Mixes

In calculating a mix, the proper figures are substituted in each of the formulas and the remaining simple arithmetic performed. Some practice is required before proficiency in these calculations is attained.

A number of problems are offered as a guide. The first (below) illustrates a commonly used mix in which cream, skim milk and condensed skim milk are used.

Problem 1—Make 100 lb. of Mix Using Normally Available Ingredients.

Ingredients	Mix to Contain
Cream, 30% fat	12.0% fat
Skim, 9% s.s.	11.0% serum solids
Cond. skim, 27% s.s.	15.0% sugar
Sugar	0.3% stabilizer
Stabilizer	38.3% total solids

Lb. serum in mix = 100 − (total of constituents not in the serum)

$= 100 - (12.0 + 15.0 + 0.3)$

$= 72.7$

Lb. serum in 1 lb. of cond. skim = 1.00****

Substitute the above figures in formula 1:

$$\text{Lb. cond. skim} = \frac{11 - (72.7 \times 0.09)}{0.27 - (1.00 \times 0.09)} = \frac{11 - 6.543}{0.27 - 0.09}$$

$$= \frac{4.457}{0.18} = 24.76$$

Find the amount of skim and cream.

The mix now contains:

Cond. skim	24.76 lb.
Sugar	15.00 lb.
Stabilizer	0.30 lb.
Total	40.06 lb.

Lb. skim milk and cream needed = 100 − 40.06 = 59.94

$$\text{Lb. cream needed} = \frac{12 - (59.94 \times 0)}{0.30 - 0} = \frac{12}{0.30} = 40.0$$

Since the combined weight of cream and skim is 59.94 lb., the weight of the skim is

$$59.94 - 40.0 = 19.94 \text{ lb.}$$

Proof of Problem 1

Ingredients	Ingredient lb.	Fat lb.	S.s. lb.	Sugar lb.	Stabilizer lb.
Cream, 30% fat	40.00	12.00	2.52		
Cond. skim 27% s.s.	24.76		6.69		
Skim	19.94		1.79		
Sugar	15.00			15.00	
Stabilizer	0.30				0.30
Total	100.00	12.00	11.00	15.00	0.30

Inspection of the above calculations reveals some unnecessary work which could be eliminated. This was done intentionally because it enables one to calculate almost any mix with the use of only two formulas.

All mix calculations should be checked or proved before the mix is made to insure that the desired amount of each ingredient is actually provided.

Using Sweetened Condensed

The next example demonstrates principally the slightly altered calculation when the condensed product contains sugar.

Ingredients	Mix to contain
Cream, 40% fat	10.0% fat
Sweetened cond. skim, 28% s.s., 42% sugar	14.0% sugar
Whole milk, 4% fat	12.0% serum solids
Sugar	0.4% stabilizer
Stabilizer	36.4% total solids

Lb. serum in 1 lb. cond. = 1 − (constituents not in the serum)

$$= 1 - 0.42 = 0.58$$

$$\text{Lb. sw. cond. skim needed} = \frac{12 - (75.6 \times 0.09)}{0.28 - (0.58 \times 0.09)} = 22.81$$

At this point it is desirable to insert the known figures into a form which will be used later to prove the accuracy of the calculations. The sweetened condensed skim will furnish:

$$22.81 \times 0.28 = 6.39 \text{ lb. serum solids}$$

$$22.81 \times 0.42 = 9.58 \text{ lb. sugar}$$

$$\text{Lb. sugar still needed} = 14 - 9.58 = 4.42$$

The mix now contains:

Sw. cond. skim	22.81 lb.
Sugar	4.42 lb.
Stabilizer	0.40 lb.
Total	27.63 lb.

$$\text{Lb. milk and cream needed} = 100 - 27.63 = 72.37$$

$$\text{Lb. cream needed} = \frac{10 - (72.37 \times 0.04)}{0.40 - 0.04} = 19.75$$

$$\text{Lb. milk needed} = 72.47 - 19.75 = 52.72$$

Proof

Ingredients	Ingredient lb.	Fat lb.	S.s. lb.	Sugar lb.	Stabilizer lb.
Cream, 40% fat	19.75	7.90	1.07		
Sw. cond. skim, 28% s.s., 42% sugar	22.81		6.39	9.58	
Whole milk, 4% fat	52.62	2.10	4.55		
Sugar	4.42			4.42	
Stabilizer	0.40				0.40
Total	100.00	10.00	12.01	14.00	0.40

Three Butterfat Sources

In the following problem there are three sources of butterfat, three sources of serum solids, and two of sugar.

Ingredients	Mix to contain
Plastic cream, 80% fat	14.0% fat
Whole milk, 3.8%	10.0% serum solids
Sw. cond. whole milk, 8% fat, 20% s.s., 44% sugar	15.0% sugar
Sugar	0.5% stabilizer
Stabilizer	39.5% total solids

$$\text{Lb. serum in 1 lb. of cond.} = 1 - (0.08 + 0.44) = 0.48$$

$$\text{Lb. sw. cond. whole milk needed} = \frac{10 - (70.5 \times 0.09)}{0.20 - (0.48 \times 0.09)} = 23.31$$

The sweetened condensed whole milk will supply:

$$23.31 \times 0.08 = 1.86 \text{ lb. of fat}$$

$$23.31 \times 0.20 = 4.66 \text{ lb. of s.s.}$$

$$23.31 \times 0.44 = 10.26 \text{ lb. of sugar}$$

$$\text{Lb. sugar still needed} = 15 - 10.26 = 4.74.$$

The mix now contains:

Sw. cond. whole milk	23.31 lb.
Sugar	4.74 lb.
Stabilizer	0.50 lb.
Total	28.55 lb.

The remainder of the mix, 100 − 28.55 = 71.45 lb., will be a mixture of plastic cream and milk. Since the sweetened condensed whole milk supplied 1.86 lb. of fat, the amount to be supplied by the milk and cream is 14 − 1.86 = 12.14 lb.

$$\text{Lb. plastic cream} = \frac{12.14 - (71.45 \times 0.038)}{0.80 - 0.038} = 12.37$$

$$\text{Lb. milk} = 71.45 - 12.37 = 59.08$$

Proof

Ingredients	Ingredient lb.	Fat lb.	S.s. lb.	Sugar lb.	Stabilizer lb.
Plastic cream, 80% fat	12.37	9.90	0.22		
Whole milk, 3.8% fat	59.08	2.25	5.11		
Sw. cond. whole milk, 8% fat, 20% s.s., 44% sugar	23.31	1.86	4.66	10.26	
Sugar	4.74			4.74	
Stabilizer	0.50				0.50
Total	100.00	14.01	9.99	15.00	0.50

Butter and Liquid Sugar

Unsalted, sweet cream butter (preferably 92 score or better) may be used in a mix just as though it were a high testing cream, on the assumption that its serum contains 9 percent serum solids although 6 percent is more nearly accurate. In the following problem, this difference results in a shortage of serum solids of about 0.03 percent which may be disregarded.

Ingredients	Mix to contain
Butter, 83% fat	11.0% fat
Milk, 4% fat	11.5% serum solids
Non-fat milk solids, 97% s.s.	15.0% sugar
Liquid cane sugar, 67% sugar	0.4% stabilizer
Stabilizer	37.9% total solids

In previous problems, each product which contained water also contained serum solids in normal or in greater than normal concentration. Since liquid sugar contains water but no serum solids, the entire quantity used is not a part of the serum. The liquid sugar required is:

$$\frac{15}{0.67} = 22.39 \text{ lb.}$$

The serum of the mix is:

$$100 - (11.0 + 22.39 + 0.4) = 66.21 \text{ lb.}$$

$$\text{Lb. non-fat milk solids} = \frac{11.5 - (66.21 \times 0.09)}{0.97 - (1.0 \times 0.09)} = 6.30$$

* T. D. Cutler, "Proportioning Mixes Made Easy." *Ice Cream Trade Journal*, 18, 9, 45, 1922.

** It is necessary to assume that the serum or skim milk portion of all milk products to be used in a mix, other than condensed or dried milks, contains a fixed percentage of serum solids. If the average serum solids content of milk serum is unknown, a figure of 9 percent may be assumed. Condensed and dried milks contain a greater percentage of serum solids and are used in the mix for that reason.

*** Abbreviations and terms used are as follows: s.s. means serum solids; cond. means any of the condensed or dried milks; skim. means skim milk; concentrated fat ingredient includes fresh, plastic or frozen cream, butter and butter oil.

**** Condensed skim milk is considered to contain nothing but serum solids and water and is therefore 100 percent serum.

The mix now contains:

Non-fat milk solids	6.30 lb.
Liquid sugar	22.39 lb.
Stabilizer	0.40 lb.
Total	29.09 lb.

The remainder, 100 − 29.09 = 70.91 lb., will be a mixture of butter and milk.

$$\text{Lb. of butter} = \frac{11 - (70.91 \times 0.04)}{0.83 - 0.04} = 10.33$$

Lb. milk = 70.91 − 10.33 = 60.58

Ingredients	Proof	Ingredient lb.	Fat lb.	S.s. lb.	Sugar lb.	Stabilizer lb.
Butter, 83% fat		10.33	8.57	0.16		
Whole milk, 4% fat		60.58	2.42	5.23		
Non-fat milk solids, 97% s.s.		6.30		6.11		
Liquid cane sugar, 67% sugar		22.39			15.00	
Stabilizer		0.40				0.40
Total		100.00	10.99	11.50	15.00	0.40

Fat and Solids From Several Sources

In the previous problems there was one source each of extra butterfat and extra serum solids plus whole milk or skim milk. When it is desired to use more than one source of any of these, it is necessary to modify the calculations slightly. The following problem is a typical example in which it is desired to use some frozen cream and sweetened condensed whole milk for reasons of economy but the amounts are to be limited because of a possible effect on flavor. Calculations are for 4,000 lb. of mix.

Ingredients	Mix to contain
100 lb. butter, 83% fat, 1% s.s.	12.0% fat
400 lb. sw. cond. whole milk, 8% fat, 22% s.s., 42% sugar	11.0% serum solids
Cream, 30% fat	15.0% sugar
Milk, 4% fat	0.3% stabilizer
Cond. skim, 27% s.s.	38.3% total solids
Sugar	
Stabilizer	

Calculate the weight of fat, serum solids, etc., needed and subtract from this the amount supplied by the butter and sweetened condensed milk.

	Mix	Fat	S.s.	Sugar	Stabilizer
Lb. needed	4,000	480	440	600	12
Butter, 83% fat, 1% s.s.	100	83	1		
Sw. cond. whole milk, 8% fat, 22% s.s., 42% sugar	400	32	88	168	
Totals supplied thus far	500	115	89	168	0
Lb. still needed	3,500	365	351	432	12

These figures may now be treated as a new mix. The serum of the new mix is 3,500 − (365 + 432 + 12) = 2,691 lb.

$$\text{Lb. cond. skim} = \frac{351 - (2{,}691 \times 0.09)}{0.27 - 0.09} = 604.4$$

The mix now contains:

Cond. skim	604.4 lb.
Sugar	432.0 lb.
Stabilizer	12.0 lb.
Total	1,048.4 lb.

Lb. cream and milk = 3,500 − 1,048.4 = 2,451.6

$$\text{Lb. cream} = \frac{365 - (2{,}451.6 \times 0.04)}{0.30 - 0.04} = 1{,}026.5$$

Lb. milk = 2,451.6 − 1,026.5 = 1,425.1

Ingredients	Proof	Ingredient lb.	Fat lb.	S.s. lb.	Sugar lb.	Stabilizer lb.
Butter, 83% fat, 1% s.s.		100.0	83.0	1.0		
Sw. cond. skim, 8% fat, 22% s.s., 42% sugar		400.0	32.0	88.0	168.0	
Cream, 30% fat		1,026.5	308.0	64.7		
Milk, 4% fat		1,425.1	57.0	123.1		
Cond. skim, 27% s.s.		604.4		163.2		
Sugar		432.0			432.0	
Stabilizer		12.0				12.0
Total		4,000.0	480.0	440.0	600.0	12.0
Percent composition			12.0	11.0	15.0	0.3

In some areas there is no source of milk or skim milk for ice cream mixes and it is necessary to use water instead. When the ingredients include only one source of butterfat, the mix may be calculated quite simply by finding first the amount of this ingredient which will furnish the required butterfat. The additional serum solids needed determine the amount of condensed or dried product to be used. In such a case the serum point method need not be used. In the rather unusual circumstance in which it is desirable to use water and two products containing fat, the mix may be calculated as though skim milk were available. This skim milk may then be reconstituted (on paper) from water and a condensed or dried skim milk product.

Sweetened Frozen Cream

Ordinarily, when stored or frozen cream is to be used in a mix, the amount is limited, the remaining extra butterfat being furnished by fresh cream. Where sweetened frozen cream is to be used as the sole source of extra fat for the mix, with whole milk as a source of bulk, it is necessary to modify the formula. The formula for finding the amount of condensed product remains the same while the concentrated fat ingredient formula becomes:

$$\text{Lb. sweetened cream} = \frac{\text{Lb. fat needed from milk and cream} - \left(100 - \left\{\begin{array}{l}\text{Lb. cond.}\\ + \text{lb. stabilizer}\\ + \text{lb. sugar}\\ \text{still needed}\end{array}\right\} \times \begin{array}{l}\text{Lb. fat}\\ \text{in 1 lb.}\\ \text{milk}\end{array}\right)}{\text{Lb. fat in 1 lb. sw. cream} - \left(\begin{array}{l}\text{Lb. fat + serum}\\ \text{in 1 lb. sw. cream}\end{array} \times \begin{array}{l}\text{Lb. fat in}\\ \text{1 lb. milk}\end{array}\right)}$$

The actual calculation of this type of problem is simpler than the formula indicates. It is demonstrated in the following example:

Ingredients	Mix to contain
Sweetened frozen cream, 50% fat, 10% sugar	13.0% fat
Sw. cond. skim, 30% s.s., 40% sugar	10.5% serum solids
Whole milk, 4% fat	15.0% sugar
Sugar	0.4% stabilizer
Stabilizer	38.9% total solids

$$\text{Lb. sw. cond. skim needed} = \frac{10.5 - (71.6 \times 0.09)}{0.30 - (0.60 \times 0.09)} = 16.49$$

$$\text{Lb. sugar in cond. skim} = 16.49 \times 0.40 = 6.60$$

Lb. sugar still needed = 15.0 − 6.60 = 8.40

$$\text{Lb. sw. cream needed} = \frac{13 - [100 - (16.49 + 0.40 + 8.40) \times 0.04]}{0.50 - (0.90 \times 0.04)}$$

$$= \frac{13 - (74.71 \times 0.04)}{0.50 - 0.036} = \frac{13 - 2.99}{0.464}$$

$$= \frac{10.01}{0.464} = 21.57$$

Lb. sugar in cream = 21.57 × 0.10 = 2.16
Lb. sugar still needed = 15 − (6.60 + 2.16) = 6.24
Lb. milk needed = 100 − (16.49 + 21.57 + 6.24 + 0.40) = 55.30

Ingredients	Proof	Ingredient lb.	Fat lb.	S.s. lb.	Sugar lb.	Stabilizer lb.
Sweetened cream (frozen), 50% fat, 10% sugar		21.57	10.79	0.78	2.16	
Sw. cond. skim, 30% s.s., 40% sugar		16.49		4.85	6.60	
Whole milk, 4% fat		55.30	2.21	4.78		
Sugar		6.24			6.24	
Stabilizer		0.40				0.40
Total		100.00	13.00	10.51	15.00	0.40

Vacuum Pan Mixes

A relatively small number of plants throughout the country are making ice cream mix in a vacuum pan. In such a process, the entire mix or the milk products portion alone is condensed to the desired point, pasteurization having been accomplished by the forewarming process. This process reduces handling of the ingredients and mechancial losses, saves processing time and removes certain weed and feed flavors. The following example illustrates the calculations involved.

Ingredients	Mix to contain
Cream, 30% fat	12.0% fat
Milk, 4% fat	11.0% serum solids
Sugar	15.0% sugar
Stabilizer	0.4% stabilizer
	38.4% total solids

Find the amount of serum which will supply 11 lb. of serum solids.

$$\frac{11}{0.09} = 122.22 \text{ lb.}$$

The serum plus fat is the necessary amount of milk and cream:

$$122.22 + 12 = 134.22 \text{ lb. of milk and cream}$$

The cream is found by use of the usual formula:

$$\text{Lb. cream needed} = \frac{12 - (134.22 \times 0.04)}{0.30 - 0.04} = 25.50$$

$$\text{Lb. milk} = 134.22 - 25.50 = 108.72$$

Proof

Ingredients	Ingredient lb.	Fat lb.	S.s. lb.	Sugar lb.	Stabilizer lb.
Cream, 30% fat	25.50	7.65	1.61		
Milk, 4%	108.72	4.35	9.39		
Sugar	15.00			15.00	
Stabilizer	0.40				0.40
Total	149.62	12.00	11.00	15.00	0.40
Water to evaporate	49.62				
Final mix	100.00	12.00	11.00	15.00	0.40

If it is desired to use up a definite weight of one of the ingredients rather than to make a specified amount of mix, the calculations may be performed as above and the results multiplied by a factor. For example, if 1,200 lb. of milk were to be used, the factor would be:

$$\frac{1,200}{108.72} = 11.04$$

Restandardization of Off-Batches

Thus far the calculations discussed have involved finding the amounts of ingredients to use in the mix. After the mix is made, it may be tested and restandardized if it does not check out as closely as desired. Many of the larger plants are set up to do this as a routine procedure but most smaller manufacturers regard it as too time-consuming. Actually, if accurate tests on the ingredients are available and weighing is carefully done, it will only be necessary to test the finished mix as a final check on the complete operation and restandardization may usually be omitted. The following problem illustrates the method of calculations which may be used when the mix is found to contain too much of one or more constituents.

Problem 2—Correcting a Mix in Fat.

Have 3,000 lb. of mix testing-percent	Mix should have tested-percent
13.0 fat	12.0 fat
10.0 serum solids	10.0 serum solids
15.0 sugar	15.0 sugar
0.3 stabilizer	0.3 stabilizer
	37.3 total solids

Ingredients available for standardization: Cond. skim, 27% s.s.; Skim, 9% s.s.; Sugar; Stabilizer.

The mix has one percent excess fat or $3,000 \times 0.01 = 30$ lb. The weight of the mix must be increased to take care of this excess fat. This 30 lb. of fat will supply enough fat for

$$\frac{0.12}{30} = 250 \text{ lb. of } 12\% \text{ mix}$$

This 250 lb. of added materials will contain no fat but must contain the desired amounts of sugar, stabilizer and serum solids.

$$250 \times 0.15 = 37.50 \text{ lb. sugar}$$
$$250 \times 0.003 = 0.75 \text{ lb. stabilizer}$$
$$250 \times 0.10 = 25.00 \text{ lb. serum solids}$$

$$\text{Lb. serum in added ingredients} = 250 - (37.50 + 0.75) = 211.75$$

$$\text{Lb. cond. needed} = \frac{25 - (211.75 \times 0.09)}{0.27 - 0.09} = 33.00$$

$$\text{Lb. skim needed} = 211.75 - 33.00 = 178.75$$

Proof of Problem 2.

	Ingredients lb.	Fat lb.	S.s. lb.	Sugar lb.	Stabilizer lb.
Cond. Skim, 27% s.s.	33.00		8.9		
Skim	178.75		16.09		
Sugar	37.50			37.50	
Stabilizer	0.75				0.75
Total	250.00		25.00	37.50	0.75
Original mix	3,000.00	390.00	300.00	450.00	9.00
Restandardized mix	3,250.00	390.00	325.00	487.50	9.75
Composition Percent		12.00	10.00	15.00	0.30

The final problem shows how to restandardize a mix which has tested lower than desired in one or more constituents.

Problem 3—Correcting a Mix in Fat and Serum Solids.

Have 3,000 lb. of mix testing-percent	Mix should have tested-percent
11.4 fat	12.0 fat
9.6 serum solids	10.0 serum solids
15.0 sugar	15.0 sugar
0.3 stabilizer	0.3 stabilizer
	37.3 total solids

Ingredients available for standardization: Cream, 40% fat; Milk, 4% fat; Cond. skim, 27% s.s.; Sugar and stabilizer.

An arbitrary amount of mix, say 400 lb., must be added which contains enough excess fat and serum solids to make up the shortages in the original mix.

Lb. fat needed

$3,000 \times 0.006 = 18.0$
$400 \times 0.12 = 48.0$
Total 66.0

Lb. serum solids needed

$3.000 \times 0.004 = 12.0$
$400 \times 0.10 = 40.0$
Total 52.0

$$\text{Lb. sugar} = 400 \times 0.15 = 60.0$$

$$\text{Lb. stabilizer} = 400 \times 0.003 = 1.2$$

$$\text{Lb. serum} = 400 - (66.0 + 60.0 + 1.2) = 272.8$$

$$\text{Lb. cond. skim needed} = \frac{52.0 - (272.8 \times 0.09)}{0.27 - 0.09} = 152.5$$

$$\text{Lb. milk and cream needed} = 400 - (152.50 + 60.0 + 1.2) = 186.3$$

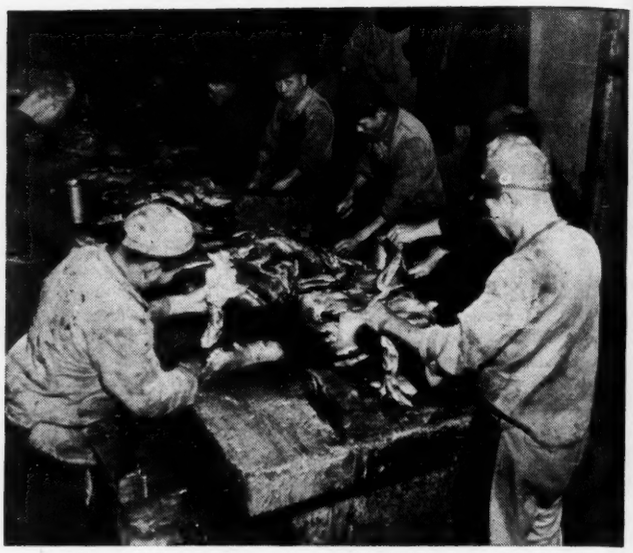
$$\text{Lb. cream needed} = \frac{66.0 - (186.3 \times 0.04)}{0.40 - 0.04} = 162.64$$

$$\text{Lb. milk needed} = 186.30 - 162.64 = 23.66$$

Proof of Problem 3.

	Ingredients lb.	Fat lb.	S.s. lb.	Sugar lb.	Stabilizer lb.
Cream 40% fat	162.64	65.06	8.78		
Milk, 4% fat	23.66	0.95	2.04		
Cond. skim, 27% s.s.	152.50		41.18		
Sugar	60.00			60.00	
Stabilizer	1.20				1.20
Total	400.00	66.01	52.00	60.00	1.20
Original mix	3,000.00	342.00	288.00	450.00	9.00
Restandardized mix	3,400.00	408.01	340.00	510.00	10.20
Composition Percent		12.00	10.00	15.00	0.30

1. **WASHING the fish is the first step in converting the material into Japanese roll type fish cakes or fish balls.**



2. **CUTTERS remove the inedible parts of the fish and chop remainder into small pieces, ready for next operation.**

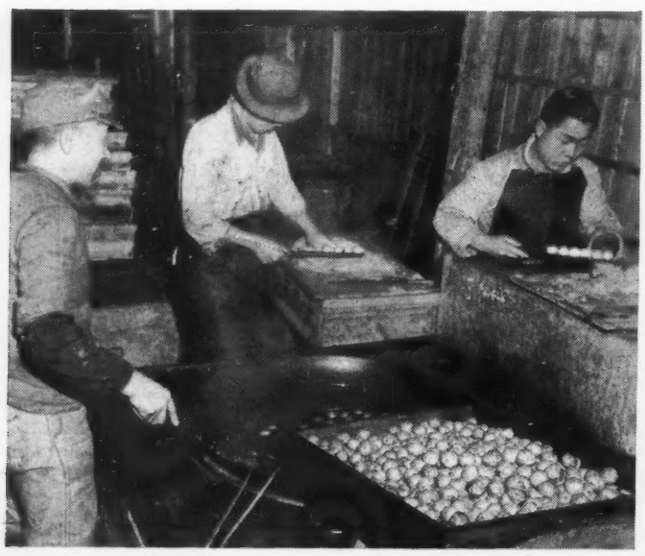
Here Fish Cakes Are Rolled

This is how the Japanese produce fish cakes in rolled form as well as fish balls, while processing the inedible material into gelatin and fertilizer

WITH economic balances badly out of line everywhere in the world, the production activities in any one area holds a great deal more than just academic interest for every other area. This is particularly true of food processing.

American producers of practically every type of processed food are watching foreign developments as closely as they are watching the home front, in the hope of finding the key to present and long range demand for their products.

These photographs, illustrating production of roll type fish cakes and fish balls in Japan, were made by the U. S. Army Signal Corps for the Fisheries Division, Natural Resources Section, GHQ — SCAP. Several species of fish are depicted in these operations, although the waste salvage, shown in the last three pictures, is confined to shark.



7. **FISH BALLS from similar doughs were being formed, in the meantime, in another building for baking in that form.**

8. **SALVAGING waste material is not overlooked. Here, shark skin is boiled to extract gelatin from skin and meat.**

3. MIXERS beat the chopped fish into dough, in the first machine operation. It is now ready to be formed.

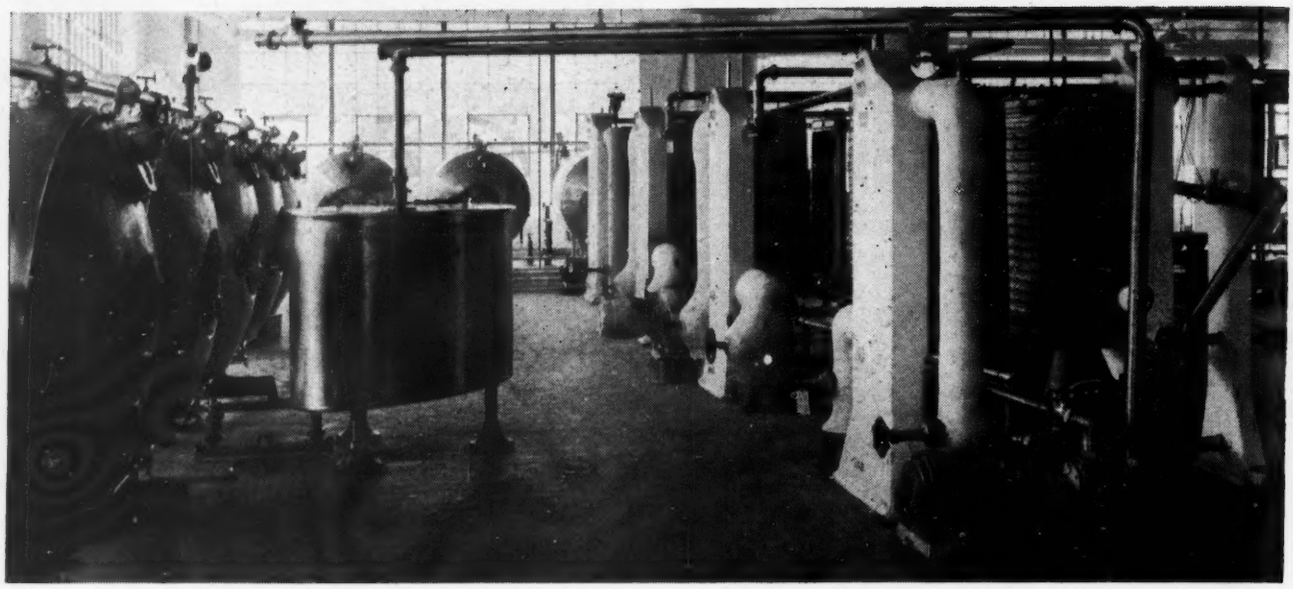
4. ROLLED into the desired shape on this machine, the dough is ready for baking as a Japanese roll type fish cake.

5. BAKED on the rods on which they were formed, the rolled cakes can be seen in this picture emerging from the oven.

6. RACKS are utilized for the next and final step before the rolled fish cakes are placed on the Japanese market.

9. GELATIN produced here totals about 85 lb., extracted from approximately 200 lb. of skin and clinging flesh.

10. BONES AND TAILS of the fish are ground to make fertilizer, which is then utilized by Japanese farmers.



PRODUCT contamination occurs if the new equipment selected is not of sanitary construction, or if it is not corrosion-resistant. This applies to all food processing equipment such as mixers, pasteurizers, storage tanks, filling and packaging machines.

How To Select Equipment

Part I—An orderly program is suggested to simplify and to minimize

By J. G. BROWN, Licensed Professional Engineer, New York City

CHIEF consideration in selecting new equipment for a food plant is an orderly established program. This program should provide not only for specialized analysis by equipment experts but also for contributions from all departments.

This article will show how the selection of new equipment may be simplified and costly errors may be minimized by: (1) Observing some guiding principles that have been gained through experience and (2) following an outlined procedure which has been found practical.

Of the three factors in food processing plants, materials, personnel and physical plant, the latter has often been overshadowed by the urgency of the first two factors.

The term "physical plant", as here used, covers land, buildings, utilities, services, machinery and equipment. There is considerable literature on such technical matters as selection of proper plant sites, details of building construction and the like. Accordingly, this article will discuss only the selection of machinery and equipment used in food processing and related operations. It is a little surprising how many different departments and individuals may be directly concerned with equipment and its selection. Some may initiate action, and others may be called in only for consultation later on. In either case, a plant manager must expect, and must even demand, assistance from his staff in selecting new equipment. For this reason, the staff or supervision meetings, which many concerns hold periodically, form an ideal place to work out certain aspects of equipment selection.

Why New Equipment

The subject of selecting equipment may come up in these meetings in several different ways. One of the commonest is in connection with replacing existing equipment. For example, the plant engineer may report, "No. 2 vinegar bottling machine is completely worn out, and I'm afraid we can't keep it running more than another six months." Or, a foreman may remark that a drier is frequently producing a defective product and causing considerable material losses.

Another frequent approach is the need for increased production. The superintendent may complain of the overtime necessary in some "bottleneck" operation and point out that it could be eliminated with a new higher-capacity unit.

Perhaps the chief chemist reports that a mixer has been found to be contaminating a product. This condition may be attributed to unsanitary construction of the equipment. If this is so, the mixer must be replaced at once.

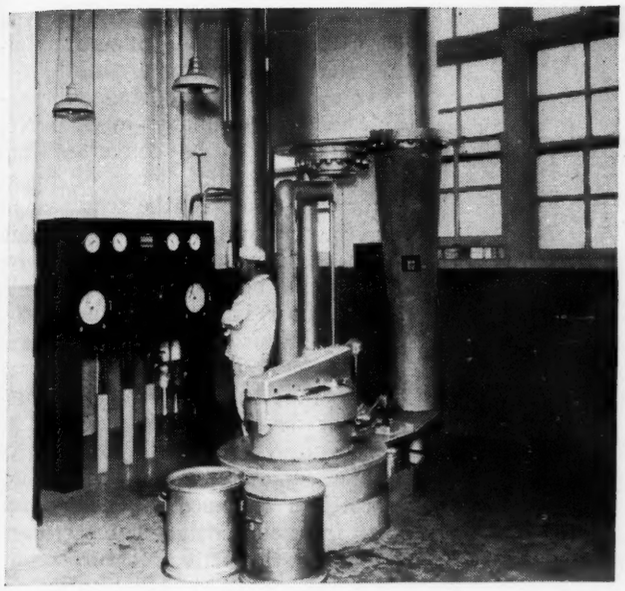
It may be that cost and sales figures will be cited to show that Product X is costing too much to produce. Also, equipment needed to make Product X at a cost lower than that of Competitor Y is essential for profitable operation.

Finally, new equipment may be sought for a more intangible but equally important reason—the improvement of working conditions. For example, unions may protest against hazardous or unhealthful conditions that can be remedied by installation of specific pieces of new equipment.

It is a good idea to make sure that all ideas on the selection of equipment from various departments are given due consideration. Usually a discussion at this stage will be impractical. Consequently, each department will have to prepare its case for later use.

The following procedure is recommended for selecting equipment in food plants:

1. General discussion of equipment requirements.



SINGLE INSTRUMENT control at the place of application (left) or centralized control on a panel board (right) are two methods of installation. Where capital investment permits, the trend is toward use of central station panel board control installations.

For Food Processing Plants

costly errors in the purchase of new food machinery and equipment

2. Assignment of someone to investigate.
3. Formulation of requirements.
4. Planning stage to interpret requirements in terms of equipment.
5. Development of cost and delivery estimates.
6. Justification of the investment.
7. Presentation of the data for executive approval.
8. Revision of requirements developed in Step No. 3.
9. Formulation of desired performance guarantee from Step No. 8.
10. Preparation of detailed specifications and securing of bids thereon.
11. Evaluation of competitive bids.
12. Actual purchase.
13. Check-up after installation.

Step No. 1 in the selection of equipment is a general discussion and consideration by all departments concerned.

Without attempting to exhaust the possibilities, the following list will show some aspects of a new equipment proposal that will interest various departments with specialized knowledge and responsibilities:

1. Supervision.
   a. Labor requirements of new equipment—number of operators, their classification and probable labor reaction.
   b. Relation to other parts of process — production rate, process, material flow and bottlenecks.
2. Engineering.
   a. Space and utility requirements.
   b. Maintenance and adjustments.
3. Laboratory.
   a. Corrosion-resistant materials.
   b. Sanitary construction.
   c. Ease of cleaning.
4. Financial.
   a. Investment and capital charges.
   b. Operating costs.
5. Sales and advertising.
   a. Adequacy for future volume of production and sales.
   b. Relation to appearance of product or containers.
6. Purchasing.
   a. Effect upon raw material specifications or requirements.
   b. Effect upon supplies, specifications or requirements.
7. Management.
   a. Justification upon basis of profit and general business outlook.
   b. Effect upon employee relations.

Step No. 2 is to assign a responsible individual (or in the case of very large projects, perhaps a group under a project leader) to carry out a detailed investigation. This assignment in many cases is more or less automatic. Although company organization charts may differ, it is often customary for the plant engineer to take over at this point.

In this issue, the author presents seven steps in preparing a proposal on equipment purchase for executive decision. Part II of this article, which will be published in a future issue, will discuss the further handling of equipment purchases that are given executive approval—The Editors.

Setting Up Requirements

Step No. 3 is to collect all the general ideas and information brought up at the staff meeting, and from them to formulate a written statement of the basic requirements. Although this statement cannot always be complete in every detail, it should be as definite and quantitative as conditions will permit. It should cover the operation that the equipment is to perform, approximate rate or capacity required and the desired materials of construction. This information, perhaps set forth on a standard form similar to Chart 1, may then be circulated among the various departments for their approval before proceeding further.

Step No. 4 may be called the "planning stage". It is at this stage that the experience and judgment of the investigator are brought to bear upon the problem. The investigator may be a novice, who may turn to a consultant for information he lacks. Or, he may be a mature,

CHART 1.—REQUIREMENT SHEET—PROPOSED NEW EQUIPMENT

(Suggested Form for Step No. 3)

Item no. ..... Date .....

For dept. .....

Equipment proposed .....

For purpose of .....

Desired capacity or rate .....

Estimated labor requirements .....

Estimated space .....

Estimated utility requirements .....

Proposed materials of construction .....

Raw materials to be used .....

Supplies to be used .....

Noted and approved: .....

Superintendent's office ..... Date .....
Engineering dept. ..... Date .....
Laboratory ..... Date .....
Purchasing dept. ..... Date .....
Sales dept. ..... Date .....

CHART 2.—REQUEST FOR APPROVAL OF NEW EQUIPMENT EXPENDITURE

(Suggested Form for Step No. 7)

Item no. ..... Submitted date .....
For dept. ..... Submitted by .....
Equipment proposed .....
For purpose of .....

Estimated purchase price .....
Estimated installation cost .....
Estimated total cost .....

Estimated purchase date .....
Estimated installation date .....

Basis on which proposed
To replace old equipment ..... To improve working conditions .....
To increase production ..... To improve product quality .....
To reduce costs .....

Annual depreciation .....
Annual interest, insurance, taxes .....
Annual total capital charges .....

Estimated gross savings .....
Less annual capital charges .....
Estimated annual net savings .....
Percent return on investment .....

Details on equipment being replaced
Date purchased .....
Residual book value .....
Condition .....
Estimated salvage value .....

Details of increased production
Capacity of present equipment .....
Capacity of proposed equipment .....

Details of savings
See attached sheet .....

Details of improved working conditions
See attached sheet .....

Details of improved product quality
See attached sheet .....

widely experienced individual, who can arrive at sound conclusions almost (it would seem) by intuition.

In general, at this stage, the requirements formulated in Step No. 3 will have to be converted into terms of specific pieces of apparatus. For example, the requirement may be to grind a solid to a certain fineness. Then some choice will have to be made between a hammer mill, comminutor, ball mill, or the like.

If previous experience does not provide a ready solution, this may be the time to call upon the laboratory or development department to carry out experiments intended to define equipment requirements accurately. Assistance may be obtained also from equipment manufacturers. Many of these manufacturers provide well-staffed laboratories or pilot plants for such customer service.

Cost and Delivery Estimates

Step No. 5 will be to develop approximate cost and delivery estimates. Since it is customary to work up preliminary estimates, the needed cooperation is usually forthcoming from equipment manufacturers.

Of course, there is always the possibility that the investigator will find, on preliminary investigation, that no one makes the equipment he is seeking. The problem of getting preliminary cost estimates is then considerably more complicated. Either he must design his own apparatus and estimate the cost of constructing it in his own plant maintenance or repair shop. Or, he must take the problem to a consultant or an outside firm specializing in designing and building equipment to order.

Step No. 6 may be called "justifying the investment". It involves the comparison of estimated costs of the proposed new equipment with the benefits to be expected from its acquisition. Just how this is done will depend upon the item under consideration. Is it being bought to replace old equipment, to increase production, to reduce costs, to improve working conditions or to improve product quality? A little further discussion of this step may be desirable.

Replacement

The residual book value of equipment being replaced should always be considered. If the equipment has lasted its normal life, this value will be zero. But, if for some reason (as unexpected obsolescence, or occa-

(*Continued on page* 204)

Food Director Fitzgerald Explains . . .

The ABCs of ERP Transactions

U. S. food exports under the recovery program are determined by the receiving countries on a law-prescribed basis of cost and overall requirements. This limits selection, particularly of processed foods

By D. A. FITZGERALD, Director of Food,
Economic Cooperation Administration, Washington, D. C.

"HOW may we participate in the European Recovery Program?" This is the question most frequently put to us by American businessmen. And naturally, we in the Economic Cooperation Administration—the agency created by Congress to carry out this country's part in ERP—are most anxious to supply as much information as we can.

We are now getting the first year's recovery program underway. To date, we have been operating with funds advanced by RFC—in order to keep the most essential foodstuffs flowing to Europe until such time as Congress votes the money to carry out the program for the initial year. Which brings me to one point that has not been fully understood:

Depend on Congress

The Administrator of the Economic Cooperation Administration, Paul G. Hoffman, and his aides have had to go to Congress for money to carry out ECA plans—in exactly the same way as does any other government agency, be it Commerce, State Department, or Agriculture.

In passing the Foreign Assistance Act, which set up ECA, Congress merely authorized the appropriations of $5,300,000,000 for the first year's European program and instructed RFC to advance us $1,000,000,000. Then the Executive Branch had to go back to the Congress and justify its plans for spending that money—justify it to the appropriations committees of both Houses.

In considering the program, it should be emphasized first of all that its objective is to assist the recovery of the industry and economy of Europe.

Thus, the initial basis on which we should proceed is that the European countries themselves are likely to know best what they need, and how much they need. Certainly they have a far more intimate knowledge of their own economies than we do. Hence, we are going to look initially to the European countries themselves to say what they require—rather than to decide over here what we might like to sell them.

This means that each country's

list of requirements for food, raw materials, industrial equipment, or what have you, are transmitted to the organization of the 16 countries (which is now operating in Paris) for analysis and possible revision in order that the total resources available to the participating countries may be used most effectively in promoting intra-European recovery. In making these analyses and revisions, the 16-nation organization will have the assistance of W. Averell Harriman, ECA's European representative, and his staff.

U. S. Approval

The next step is for the country programs, as revised by the Paris organization, to be sent to ECA in Washington for review and approval. We, in Washington, will be concerned particularly in assuring that these programs do not impair fulfillment of the vital needs of the people of the United States, thus minimizing the drain on United States resources. This may require reduction of the Paris-recommended programs, in those items for which available supplies are inadequate, and the substitution of others for which availabilities are more ample.

Final step is the approval of the programs as modified, the establishment of credits from ECA funds, and the issuance of the necessary procurement authorizations containing such safeguards as are necessary to assure that the credits are used for authorized purposes and in a manner that avoids any undue price inflation.

Note that ECA does not buy anything. It is not a procurement agency. To the extent that U. S. government procurement is necessary, ECA will rely on the Department of Agriculture, the Department of the Army, and the Federal Bureau of Supply. In fact, we are required by the law to reduce government buying under this program to the absolute minimum—and we propose to follow that directive.

The job of the ECA staff in Washington, then, is something like that of a banker. The money voted by Congress to speed the economic recovery of Europe is in effect so many dollars deposited to the credit of the European countries. ECA has been given the power, however, to disapprove any country's drawing on its credit for purposes (1) that may be uneconomical for the Europeans themselves, or (2) that may have undesirable effects on the U. S. economy.

The Europeans themselves will be most cautious in the expenditure of the amounts deposited with us to their credit. They will want to get their money's worth. For instance, they will want raw foodstuffs for the most part, not finished food products.

These Values Give the Key

Nutrient Cost of Selected Foods (At U. S. Port, Prices Prevailing About May 15, 1948)

	c per 1,000 Calories	c per 100 Grams Protein
Sugar, raw	2.3	—
Wheat	3.3	7.5
Corn	3.5	10.7
Dry edible peas	4.4	6.3
Lard	5.9	—
Dried raisins	6.1	71.3
Dry edible beans	7.0	10.8
Dry skim milk	9.1	9.2
Canned horse meat	13.6	17.5
Concentrated grapefruit juice	17.6	181.6
Canned sweet potatoes	20.7	180.1
Cheddar cheese	31.2	52.7
Canned green peas	39.1	61.4

Why? Because each country has its own food processing industry, which itself is part of the economy ECA has been directed to restore. Because, dollar for dollar, the ERP countries know they get more for their money in raw foods—like grains—than in finished products, like bread. Because, it's cheaper to transport raw foodstuffs than finished food products. (*Editor's note*: The case in favor of packaged foods was considered in the June article of this series.)

The accompanying table, "Nutrient Cost of Selected Foods," reveals the heart of the situation. It is true that there is more in food than just calories, but right now the Europeans are interested in buying for their people the maximum calories per dollar. It is calories they need to supply the energy so that their workers will have the strength to get the wheels of industry turning at top speed.

Balanced Diet

We all agree that a balanced diet, as Americans conceive it, would be much better for them. But Europeans do have nearly adequate supplies of many of the foods that go to make up a balanced diet. Fresh fruit and vegetable production in most European countries is about at prewar levels.

So the Europeans, who took more than 570,000,000 bu. of grain from U. S. this past year, are still most interested in getting from their overseas sources—including the U. S.—the foodstuffs that provide the most calories per dollar.

Processed Foods

Preliminary indications are that ECA funds will be asked for certain quantities of dairy products, fresh and dried fruits, fats and oils, dried eggs, and peas and beans. There undoubtedly will be some demand from the ERP countries for certain specialty products for which they have particular needs. Moreover, the preference of the participating countries is likely to be for more grains, fats and oils, and the like, than we can spare, and an opportunity will arise to substitute products that may be shipped without adverse effects on the U. S. economy.

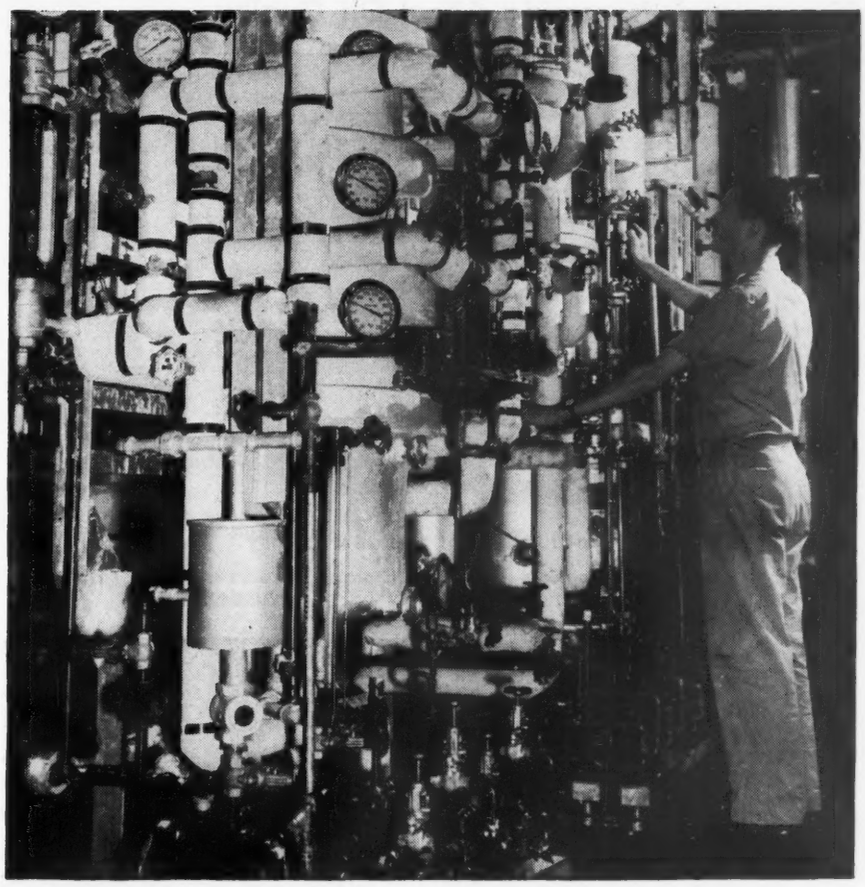
Some of these commodities may be furnished out of stocks bought by the Department of Agriculture under its price-support programs—in which event up to 50 percent of the cost may be made up out of the so-called Section 32 funds, which are available to the Department of Agriculture. This same procedure may be followed for other surplus commodities even though they are not in government stocks.

There is, however, no reason for the food processor or his representatives to come to Washington to sell his products to ECA.

This can be made perfectly clear, I think, by quoting a joint policy statement drawn up by the Department of Commerce (which handles the export licensing procedures) and the Economic Cooperation Administration. A pertinent section reads:

"Exporters who have established business contacts with agents and distributors in Europe should continue to solicit business as they have normally done in the past. . . . The European importer will obtain permission from his government to pay for his goods with dollars set aside for ERP purchases . . . The European importer — not the United States exporter — will initiate the first action in requesting permission to use ECA dollars to pay for shipment . . . The ECA is primarily concerned with providing financing to the ERP countries, with determining—in consultation with those countries—how the funds shall be used, and with keeping account of the funds used. It will not decide *which* exporters are to do business with Europe. And it will not decide which brands or makes of a particular product will be paid for with ECA money. These decisions will be made by the European importer who buys the goods he considers the best.

PEANUT OIL is separated from solvent at Southern Regional Research Laboratory pilot extraction plant. Research seeks cheaper, better table fats and oils. (USDA photo)



Recent technological progress in processing fats and oils has already had some effect in the economic sphere, and forthcoming advances will have further economic repercussions.

Report On Progress In Fats and Oils Field

By GORDON W. McBRIDE
Editorial Consultant
Washington, D. C.

FATS and oils, both animal and vegetable, are on the threshold of a new period—a period in which competition and enterprise will again play a primary part. And indications are that this competition will be notable, not only in its technological but also in its economic aspects.

Scientific advances in the processing of fats and oils have already resulted in more economical manufacture of products featuring improved qualities. Every step forward, whether in the edible or chemical field, demands the careful attention of the food technologist. For with every advance there is a potential effect upon his competitive relationships.

Supplies of the various fats and oils in 1948 will be about the same, relatively, as in 1947. Some decline in lard output is expected as a result of the reduced corn crop last year. Soybean oil produced in 1948 will also be down because of the slightly smaller 1947 crop. Cottonseed oil production will be larger than last season, and imports of coconut oil are expected to remain as large, or perhaps increase.

Inedible fats, both for soap and drying oil use, will be about the same, with perhaps some slight declines in inedible tallow and grease offset by increased production of linseed oil from the large 1947 flaxseed crop.

Coconut oil, being available in large quantity again, has simplified the technical problems of a number of food industries. More important, it has been of great help economically in keeping fats and oil prices from going significantly higher. The Philippine supply of coconut oil was in 1947 more plentiful than in some prewar years. A large supply of this oil can be expected to continue to be available to domestic industry. The Philippines and other Pacific coconut-growing areas need the U. S. dollars to restore war damage and strengthen their economies. Incidentally, more pounds of coconut oil can be grown per acre-year than any other vegetable oil, except palm oil.

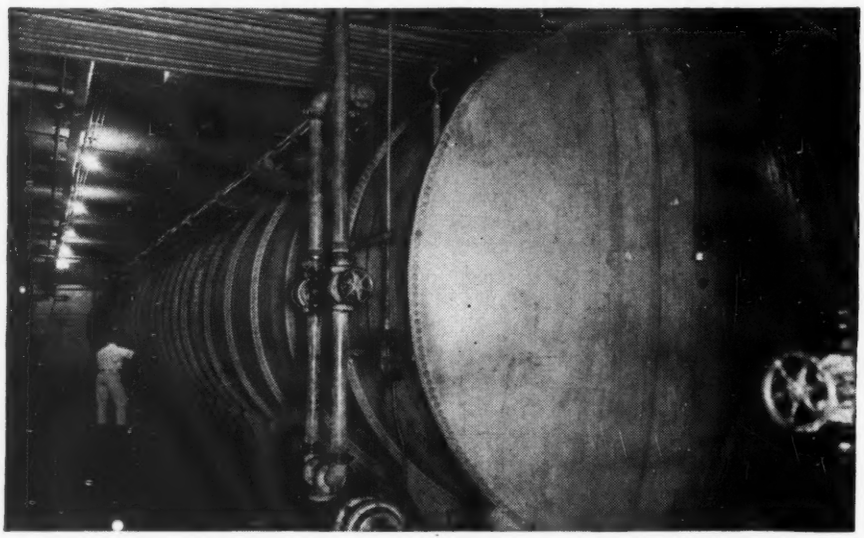
Soap kettles will continue to be the destination of the lower quality fats. A significant tonnage of good, edible quality fats also will go into soap when "normal" production of fats and oils is resumed around the world. Obviously, the soap manufacturer is happiest when he can get good quality fats at low prices. There will always be some inedible greases, however, which are useful only for industrial derivatives, such as for soaps, fatty acids, and other products.

Prices of fats and oils will, in gen-

Storage and Processing Affect Oil Quality

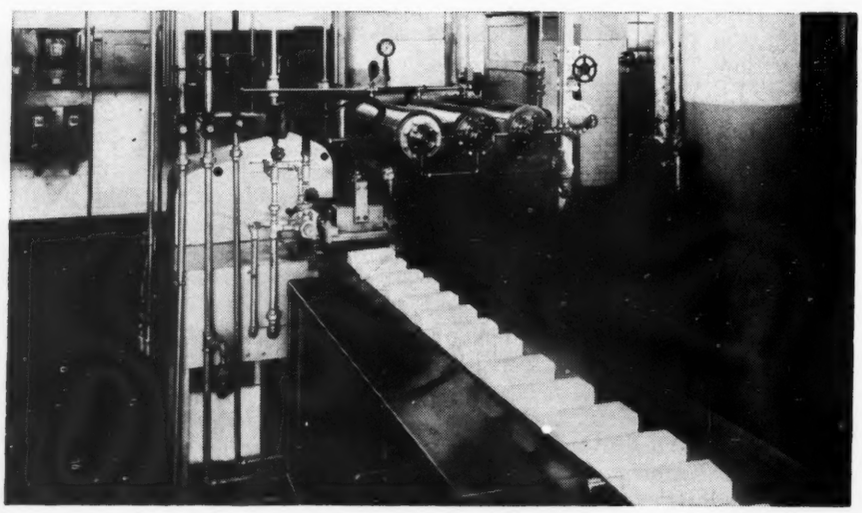
Palatability of Oil Is Primary

Taste panel at Northern Regional Research Laboratory evaluates edible soybean oil flavor, keeping qualities. Tests check on refining processes. (USDA photo)



Efficient Storage Protects Its Quality

Filtered oil is stored in 60,000-gal. glass-lined storage tanks at vegetable oil plant. High vacuum is used to keep atmospheric oxygen from contacting the oil.



Last Step—Into Product

Oils find important use in margarine. Here, Votator processes 4,500 lb. per hour in continuous, closed operation, economical of refrigeration, space and labor.

eral, remain high in 1948 because industrial activity and consumer incomes are likely to continue near the record peacetime levels of 1947. Demand is expected to remain strong for all fats and oils, principally for domestic use. The European Recovery Program does not contemplate the export of an increased volume of fats and oils from this country.

Food Factors

When used in foods, nearly all edible fats and oils have equivalent food values per pound. And from the standpoint of calories there is little choice among them. The competition is a matter of palatability and price, rather than of relative nutrition. Flavor characteristics of some of them are considered an advantage, as in olive oil and butter fat; whereas the normal flavor characteristic of others is obviously a disadvantage, as is the case with some crude or reverted soybean oil.

Increased demand for all fats and oils, edible as well as inedible may result from more wide-spread uses of greases and tallow as raw materials for soap, various chemicals or other industrial derivatives. At this time we are about to enter a new era of such industrial use. As the properties of these new derivative products become better known, and as the facilities for producing them increase, large new markets will open for the fats and oils. As a result, the food industries may find that the supply from which they purchase their edible raw materials has tightened—into a smaller share.

In the opposite direction, there is some tendency for synthetic detergents made from non-fat materials to relieve the demand for soap fats. Similarly, synthetic protective coatings based on plastics of mineral rather than biologic origin will diminish the amount of linseed oil and other drying oils needed to "save the surface".

For every wash job that is done with a synthetic detergent, one use of soap has been eliminated. For every object that is manufactured or "painted" with a chemical plastic, one use for the drying oils has been eliminated.

It may be that the replacement of fats and oils by other chemical materials will keep ahead of development of new products based on fats and oils. The net effect would then be a decreased demand from the non-edible users—to the advantage of the food industries.

Re-examination of these trends from time to time should be a routine part of management's review of the raw material situation.

TECHNOLOGIC FACTORS

Storage of the oilseeds is the first phase where we see technologic improvements since prewar days. Better information is available as to temperature, humidity, and other atmospheric conditions which are important to the quality and quantity of oil which may be later recovered from the raw materials. Studies have also been made as to the relative advantage of processing the oilseeds promptly and storing the oil until needed, compared to storing the oilseeds and recovering the oil as needed.

Recently, an investigation of this problem was carried on with a large, uniform batch of cottonseed, which was stored for an extended period. Samples of the seed were taken at intervals, over a period of months, and oil was crushed from the seed, both by hydraulic press and by screw-press.

The color of this oil as first obtained was compared with that of the oil following storage under conditions comparable to normal crude oil handling. It was found that the lightest color of oil was achieved when the cottonseed was stored until the oil was needed, rather than by crushing the seed immediately and storing the crude oil. Also, cooking the cottonseed with addition of some water gave oil of better color than when the seed was cooked without addition of water prior to crushing.

New Processes

Solvent recovery of oil from the oilseeds continues to grow in popularity. New installations of oilseed processing plants have been largely of the solvent type, including some for cottonseed. Several different processes and different solvents have been developed. One of these processes (devised by Southern Regional Research Laboratory) permits a three-phase separation of oil, meal and cottonseed pigments.

This new process is based on selection of a solvent mixture which has been carefully adjusted so that its specific gravity is between that of the pigment glands and that of the cottonseed meal. After agitation in the solvent mixture has caused the pigment glands to break away from the other tissues, the flaked cottonseed kernels undergo a three-way separation: The pigment glands float to the surface of the solvent; the meal sinks to the bottom; and the oil is dissolved in the solvent. This leaves both the meal and the oil practically pigment-free, hence greatly improved color of oil and meal is possible without extensive bleaching or other treatments.

It has been indicated that some of the color pigments in cottonseed are the cause of nutritional difficulties when ordinary meal is used for feed. Immediate possibility will be improved quality of meal, if the process continues to appear economically attractive. The additional likelihood of discovering some use for these newly recovered cottonseed pigments may result in another valuable-by-product.

Costs Reduced

Systems which use expensive solvents are now economically possible when combined with recovery apparatus to minimize solvent loss. Operating expenses of a fraction of a cent per pound of recovered solvent are claimed, for example, with activated carbon installations. Such inexpensive recovery makes it possible to eliminate price as a major consideration. Low-cost solvents need not be used if a higher priced solvent mixture will give better results or improve the quality of the product.

1948 Spot-Check of Fats and Oils

Supply

Lard....Down
Soybean Oil....Down
Cottonseed Oil....Up
Coconut Oil....Up

Prices

Will remain high

Domestic Demand

Expected to remain strong

ERP

Increased export not contemplated

Refining technics have been the object of many intensive studies. Most recently publicized is a method of solvent refining of the crude oils. Known as the Solexol process, this method has been developed by the M. W. Kellogg Co., and several plant installations are actually operating.

New technics of alkali refining also continue to be investigated, and economies are claimed by proponents of the various methods.

Hydrogenation has received relatively little technical publicity in recent years. This is not a new attitude, for secrecy has been the rule rather than the exception in this field. New and improved catalysts, developed from time to time, usually denote increased economy rather than radically different technology. Perhaps most important in this stage of processing fats and oils is the potential use of ammonia as a source of hydrogen—said to be particularly attractive economically in cases where the hydrogen gas requirements are relatively small and where the plant investment required for producing hydrogen by traditional processes is considerable.

New Technics

Bleaching is now being undertaken by at least two entirely new technics, one of which uses chlorine dioxide. This differs radically from the earth bleaching, commonly used in most plants, and there is no loss of yield. Seen here is a possible trend of considerable importance. A number of soap and rendering plants have been equipped to operate by this process, and the possibility of adapting it to operations at a shortening or salad oil plant is now being investigated.

Technical descriptions of this process appeared in the May 1946 *Chemical and Metallurgical Engineering* ("Sodium Chlorite is Successfully Used for Bleaching Tallow") and in the September 1946 *Soap and Sanitary Chemicals* ("Chlorine Dioxide for Fat Bleaching").

The other new bleaching technic is the aforementioned Solexol process. Deodorizing is also claimed for this process, which uses propane to dissolve, extract, and fractionate.

Also of interest is the recently patented continuous-vacuum bleaching process used at Mrs. Tucker's Foods, Inc. This is described in U. S. Patent No. 2,428,082, issued to R. R. King.

Product Quality

Study of anti-oxidants for fats and oils — particularly important where flavor of an edible product is involved—is continuing. It probably will be a never-ending problem, since no completely satisfactory technic has been found which is adaptable to any single fat—much less to all fats and oils. Keeping quality must therefore be considered, both for the fats and oils themselves, and for the food products in which they are used.

Anti-staling materials for foods containing fats and oils are pro-

posed from time to time. One of the most recent of these is Swift and Co.'s material known as "esterine", a super-glycerinated fat developed especially for use in shortening for bread and other yeast-leavened doughs. The primary purpose for its development was production of bread and coffee cakes which "excel in tenderness and keeping quality."

Handling of fats and oils under atmospheres of nitrogen, or other comparable inert gases, has been found very helpful in a number of cases in retaining the highest quality of flavor and color. Thus, by greatly decreasing the quantity of oxygen in contact with the fat, development of off-flavors and darker colors can be greatly retarded. Perhaps the most difficult part of the problem is the design of equipment for achieving the desired effects economically. On a laboratory scale the technology has been convincingly proven.

Texture and Color

Improved texture and flavor of margarine in recent years can be given considerable credit for the increased popular acceptance of this product. Modern margarine's softening or plastic range, as the temperature increases, offers quite a contrast with the sharp melting point of earlier margarines. Continued improvement in margarine quality may be expected as long as consumption is high and competition among its manufacturers as keen.

Statistically important is the fact that margarine production in November and December of 1947 exceeded butter production for those months for the first time in history. Whether the margarine industry will be able to hold up its production rate in the season of maximum butter production remains to be seen.

Of considerable interest is the recently adopted practice of including a color capsule inside a tough plastic (Visten) package of margarine, permitting the consumer to do his coloring before opening the package —do it easier and more thoroughly. While this development has been important, removal of the Federal special tax on factory-colored margarine would probably see an end to this practice.

Lard has also been improved in texture in recent years. This animal fat—which had long been eaten after only a minimum of processing between pig and kitchen—is now frequently hydrogenated into a "manufactured" product. Physical properties and packaging technics now make it quite similar to the competitive vegetable shortenings. Less and less does one find oily lard which must be kept in the refrigerator. Here is a classic example of a "natural" food adopting an improved technology similar to that of its "manufactured" competitors, such as Crisco, Spry, and the like.

Paper in Packaging

Closely related to some of the technological developments of wartime were changes in packaging of many fat-containing foods and the fats themselves. Packaging of shortening, for example, was necessarily modified somewhat from the conventional prewar cans and jars. Paper containers entered the field in significant quantities.

Some of this wartime technology will undoubtedly be continued even when glass and tin are plentiful again. Consumer reaction to the new packaging materials and technics was not altogether unfavorable, as it justifiably was toward certain other changes necessitated by the wartime conditions.

Retention of vitamins in food products, and vitamin fortification, are also perpetual problems. For example, vitamin A occurs naturally in butter. This has long been one of the strongest arguments on which the dairy industry has leaned in its competition with margarine.

The U. S. Dept. of Agriculture recently published a national survey of commercial butter as a source of vitamin A in the diet. This study showed an average of approximately 11,000 International Units of vitamin A per pound in winter butter, and an average of about 17,500 units in summer butter. Various samples ranged from a minimum of about 8,000 to a maximum of over 26,000 units. A weighted average covering the year-round product was estimated to be about 15,000 units.

Exceed Requirement

Addition of vitamin A to margarine is currently on the basis of 15,000 units the year around, although a minimum of 9,000 units is all that is required to comply with the Food & Drug standard of identity for that product. This uniformity of vitamin addition may be an advantage to the consumer, particularly in the winter months when total vitamin intake from other foods is less than in summer months.

Vitamin D addition to fluid milk is now accepted as standard practice for a premium product. In common practice, vitamin D is not added to such milk products as ice cream, cheese, and butter, although some of these products may be made from a fortified fluid milk.

Fats in the Diet

When examining the diet of the average American consumer, we find many sources of fat. From the standpoint of tonnage, butter and margarine probably contribute the largest amount. Butterfat in other milk products, particularly fluid milk, ice cream, and cheese, add a large quantity to the diet.

Fat as a component of the meat we eat is also a large source. In some years the proportion of residual untrimmed fat on the average meat cut is large. In other years, when tallow and lard prices are high, the meat will be trimmed more closely. However, the effect of this variation on actual fat intake into the body is probably small.

The contribution of fat from various manufactured foods is important both to the animal and vegetable fat producer. Lard and vegetable shortenings, for example, occupy a very respectable place when the quantitative figures are studied. Salad dressings and salad oils contribute their share of fats to the diet.

Nuts, with the exception of the peanut, occupy a minor but important part of the fat supply. The peanut, particularly, has practically become a "staple" in the average diet. Improved technology in the manufacture of peanut butter may be given credit for some of its increased popularity.

Here, as with lard and margarine, hydrogenation and emulsion stabilizers have made possible a product of consistency which is uniform from top to bottom of the jar. The old fashioned peanut butters, still widely available, are no less nutritious, but the oil on the top of the jar and the relatively dry peanut meal at the bottom of the jar leave much to be desired after the consumer has tried one of the modern products.

Doughnuts and french fried potatoes, to name only two examples of other popular sources of fat in the diet today, seem to have lost none of their charm with the American consumer. Improved frying fats and lower prices will undoubtedly stimulate the use of such foods. Here, again, technology has lowered the fat absorption, raised the smoke point, and otherwise made frying fats more attractive, both to the commercial and domestic users.

* Margarine production in January, 1948, was 123 percent of creamery butter production, but seasonal increase in butter production and decrease in margarine production put butter back in the lead in February and March. For the first quarter of 1948, margarine production was 98.7 percent of creamery butter production. —The Editors.

BRIGHT illumination of uniform intensity is provided in this meat holding and sales cooler by a battery of 96 two-light fluorescent units.

Fluorescent Lighting Pays in Meat Sales Cooler

More effective illumination provided by Slimline lamps, which use less current and generate less heat than incandescents. Engineers solve installation problems

FLUORESCENT lighting has made three-way improvements in the sales and meat-holding room of the Coronet Packing Co., Los Angeles. Refrigeration costs and current consumption have been reduced, meat remains longer in good condition, and the room has been made more attractive.

The fluorescent fixtures require only about ⅓ the amperage that a comparable incandescent installation needs. In addition, the fluorescents are cooler, which means less refrigeration needed for the meat. Estimated saving in refrigeration is 8 tons, equivalent to 12 hp.

There are 96 two-light units in the room, providing uniform illumination of 35 footcandles. Variations in intensity in any section of the room are less than 2 footcandles. Under incandescent lighting of the same intensity the meat had a tendency to dry out on the surface in a few days because of the excessive heat of the standard lamps. This, of course, impaired its appearance.

With high-intensity fluorescent lighting, the color values are good and the meat has a normal appearance. This would not be true in low-intensity installation.

Certain factors about fluorescent units in this type of low-temperature installation should be considered. The low temperature reduces the light output, and in the engineering and layout of such a job, care should be taken to install a sufficient number of lights to compensate for this loss. It is important also that a high level of voltage be maintained. This was accomplished by limiting the number of units on each circuit to two or three.

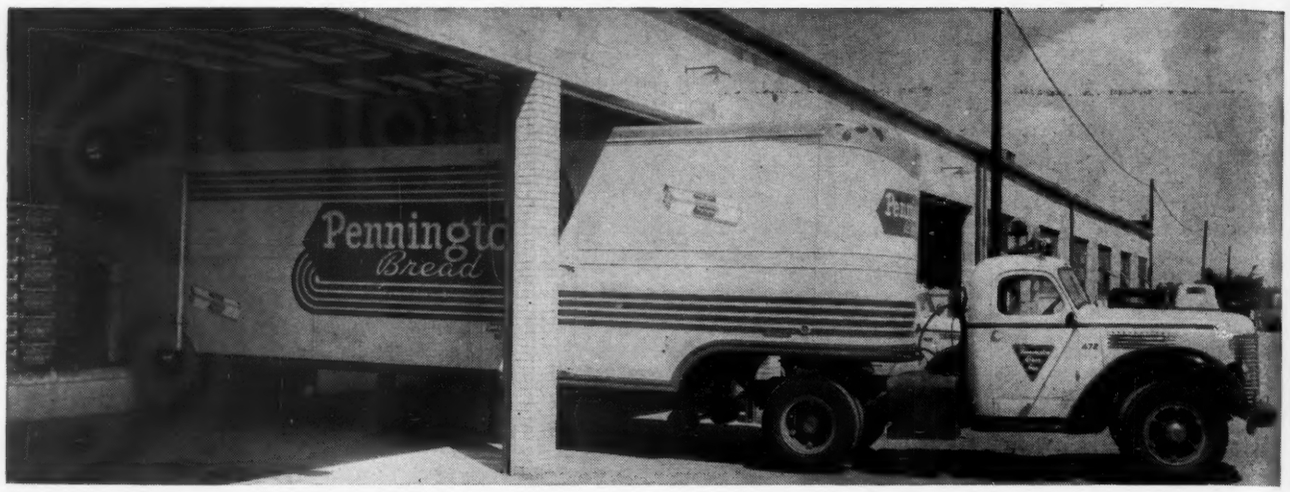
The ground floor at the Coronet plant is used for a meat holding and sales cooler and a loading dock. On the basement floor, below ground level, are the "hard" cooler and pickling and boning rooms. The temperature is zero in the hard cooler and 35 deg. in the pickling, boning rooms and the entire main floor. The structure, 96 ft. by 98 ft., one story with basement, is an addition to the existing plant.

To permit operation of auxiliary devices at normal temperature, these are mounted on a panel board in a penthouse on the roof of the new building. All the externally operated switches, magnetic motor controls, breakers, and magnetic contactors for the entire main floor, as well as the sub-feed switches and breakers for the basement power and lighting and the office and dock lighting, are on this panel board.

Steel tube conduit runs were made in the attic beneath the penthouse. From pull boxes in the attic, drops were made with conduit direct to each fixture. All the conduits were sealed to prevent moisture condensation.

Eight staggered rows of 12 units each of the new 96-in. two-light instant-start Slimline fluorescent units, employing soft white tubes, were installed in the main floor holding and sales room.

Vaporproof "off" and "on" buttons located at the ends of each row of lamps permit the switching of each row or section from either end of the room. This permits any row of meat in the cooler to be illuminated individually.



THIS long trailer is one of a fleet developed by Pennington Bakeries. The unit . . .

Tractor-Trailers Ease

Bulk rather than weight was primary consideration in choosing

PENNINGTON Bros., Inc., determined, in 1941, that specialization of product was the most efficient baking or manufacturing procedure. It was thereupon decided to make all the straight-line bread in the company's Cincinnati, Ohio, plant; all its other bread in its bakery at Washington Court House, Ohio, a small city approximately 70 miles away.

The new plans further included building a separate sweet goods plant adjacent to the Washington Court House bakery, and the use of a fleet of tractor-trailers for the mass transfer of products between the plants prior to the final sales distribution.

Wins New Business

After the installation of the initial tractor-trailer unit, the manufacturing and road distribution operations proved so satisfactory that production and the size of the tractor-trailer fleet was increased and additional new business secured in towns within a wide radius.

All of the sweet goods distributed in both the Cincinnati and Washington Court House sales territories are produced at the separate Washington Court House plant. Those sweet goods going into Cincinnati are transferred by one of the tractor-trailer combinations, which carries a full load of miscellaneous items, including sweet rolls, coffee cakes and buns.

In order to obtain the lowest cost of highway transportation, by carrying loads in both directions, some bread not produced at the Washington Court House plant is loaded at Cincinnati for the return trip to Washington Court House. In the beginning, however, this bread did not make up a full-capacity return load. Considerable savings have been made since by making up full return loads through carrying certain types of raw materials, available in Cincinnati, to the small town of Washington Court House.

The accompanying map shows the relative locations of the two plants in Cincinnati and Washington Court House and of the four garages or sub-stations in Seaman, Dayton, Lancaster and Columbus, through which the additional sales volume was secured. The Seaman sub-station is served by one of the tractor-trailer units from the Cincinnati plant and the other three locations from the Washington Court House bakeries.

At each of the four sub-station cities (Seaman, Dayton, Lancaster and Columbus) the company maintains a garage in which from five to eight wholesale delivery trucks are stored. These cover the territory within a radius of approximately 25 mi. from each garage. These individual garage distribution areas are shown on the map by circles having a radius of 25 mi. and a diameter of 50 mi. Taken with the similar delivery areas of the Cincinnati and Washington Court House plants, they indicate how completely the sales area is blanketed within the two-plant territory.

When initially developing the out-of-town territories from the four garage sub-stations, a conventional truck with a large body was used because the amount of bread carried did not justify a large tractor-trailer. But later the truck could not carry the increased bread load. Then after the tractor-trailer was installed, the company found, much to its surprise, that the operational expenses were were only a trifle more than with the conventional type truck. And the new unit carried more than three times as many loaves of bread.

Legal-Length Design

The present Pennington transport fleet is made up of three new International Model K-7 tractors and three Trailmobile 34-ft. long, drop-frame panel body, semi-trailers. Because bread is a bulky rather than a heavy commodity, the trailer has been made as long as the overall tractor-trailer length permitted by the State of Ohio motor vehicle laws. This is 45 ft. and, with a 34 ft. trailer, allows an overall tractor length of 11 ft.

The drop-frame construction of the semi-trailer—lowering the floor of the trailer behind the fifth-wheel where the floor must be high enough to mount the fifth-wheel on the tractor frame and to clear the tractor rear tires—adds to the cubical ca-

. . . CARRIES centrally produced bread to primary distribution points in open-top easily stacked cases.

Bakery Distribution

these units to serve routes from central baking plants

pacity of the trailer body, which is the maximum allowable 8 ft. width on the outside. Each trailer carries approximately 10,200 loaves of 1¼ lb. bread in box-like containers.

The company operates a fleet of 73 wholesale delivery trucks. These are maintained at the Cincinnati and Washington Court House plants and at the aforementioned garage substations, except for a few which are individually owned by the salesmen driving them. The company has found it advantageous to permit the salesman to own his truck when local territory is so far from the plant or garage that company maintenance cannot be supplied.

For its wholesale delivery trucks the Pennington company has standardized on 1½-ton Chevrolets having a 160-in.wheelbase. This wheelbase provides sufficient distance in back of the truck cab to mount a custom-built panel bread body of sufficient size to carry a full day's deliveries.

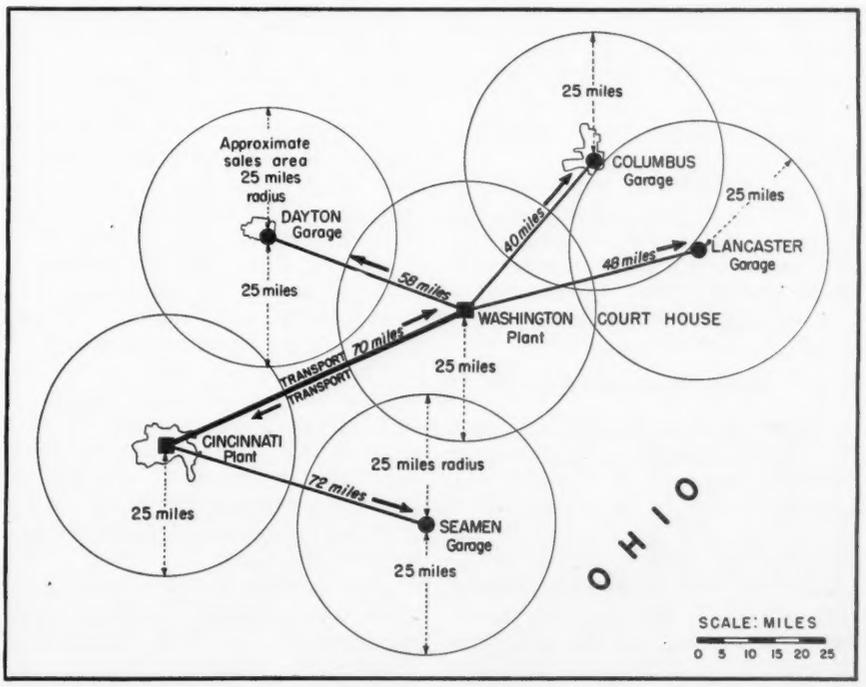
Loading Procedure

In the design and machine layout of the Pennington plants, great care was taken to expedite the loading of the tractor-trailer units. A load of 10,200 loaves is a lot of bread and the cost of loading is an important item.

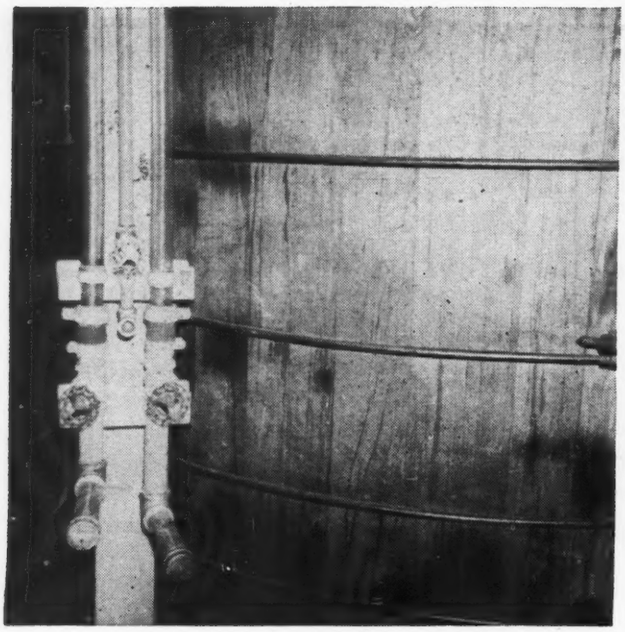
In the first place, the bread wrapping machine, which is at the extreme end of the production flow line, was placed near the vehicle loading platform. Here, as the wrapped loaves come off the mechanical conveyor, they are placed in box-like containers stacked at the machine on wheeled dollies. The containers are then pulled into the trailers in stacks of seven without any further handling or reloading.

These containers, which are open at the top, are designed to fit into the trailer bodies, five rows wide, without any loss of space. The original containers were made of compressed fiber, but the newer ones of the same width and length, but slightly higher, are made of aluminum alloy. The latter hold 24 loaves of bread each.

The transport trailers are used only at the Cincinnati and Washington Court House plants. Their subsequent use at the company's Frankfort, Ky., and Charleston, W. Va., plants will not be necessary unless operations are expanded at those locations.

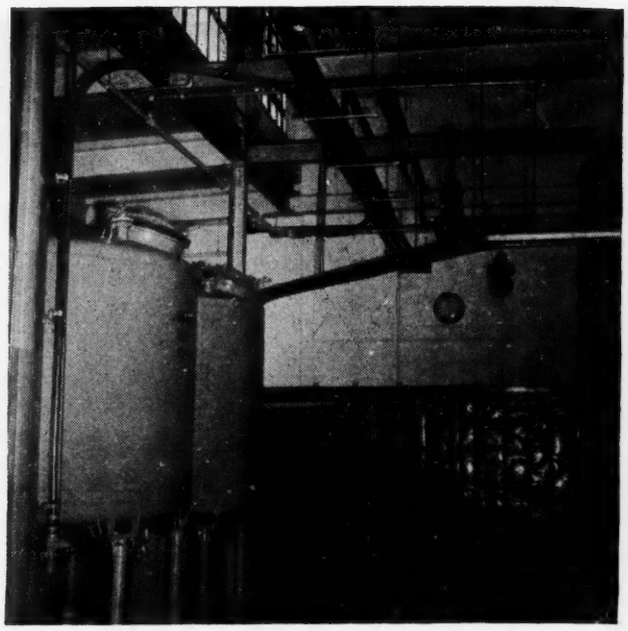


A WIDE TERRITORY is efficiently served by Pennington from three baking plants—one for straight-line bread, one for other breads, a third for sweet goods. Map gives mileage.



Longest Line Begins at Vats . . .

At wine storage tanks, leakproof rubber-hose connections are used to join plastic lines to tank's metal fixtures.



. . . Runs to Measuring Tanks . . .

Indoor lines require very few fittings, thus they have high visibility. Clamps permit expansion and contraction.

Plastic Pipelines Can "Take It"

Four-year use in winery proves worth of translucent, non-corrosive lines. They can be readily shaped and joined, are simply maintained and cleaned

By F. GALLIZIO, Consulting Chemist
G. F. Heublein & Bro., Inc., Hartford, Conn.

PIPELINES made of plastic—now completing four continuous years of service carrying wine in the plant of G. F. Heublein & Bro., Inc., Hartford, Conn.—have stood up remarkably well under all operating conditions.

Large volumes of wine have, in this time, been pumped through the lines—dry wines, sweet wines, wines with low alcoholic content, wine with 20-24 percent alcohol, wine heated at 112 deg. F., and wine cooled down to 18 deg. F.

New Lines Added

Encouraged by this performance, the company recently added two new lines to the four it already had. Length of one of these conduits is more than 450 ft. Starting in the ground floor winery, this line first takes wine from the storage tanks to the measured, tax-payment tanks. Next the tubing carries the wine through the wall and across an open passageway to the adjacent building, whence it rises to the second-floor rectifying department and bottled.

The outside lines are protected by a hood and the overhead supports, but otherwise they are exposed to the elements. They have withstood the broiling sun of summer and the chilling cold of winter, within a temperature range extending from below zero to possibly as high as 110 deg. F. With the exception of temporary slight distortions due to contraction and expansion, the lines have behaved quite satisfactorily without sustaining permanent deformities.

Plastic pipe has many of the desirable features of other materials. It is non-corrosive, translucent, and may be bent. True, it does not compare with the metals in strength or abrasion resistance, but it has shown sufficient toughness to satisfy specific requirements.

The decision to use plastic pipelines was practically imposed upon the company. In 1943, as the war progressed, materials became increasingly scarce. Materials in use, and other preferred types, became practically impossible to obtain.

Faced with this situation, the company turned to the use of plastic. In the summer of 1943 exhaustive tests were made with various plastic samples to determine their relative suitability. The choice was a plastic known as Tenite II (cellulose acetate butyrate).

Characteristics Determined

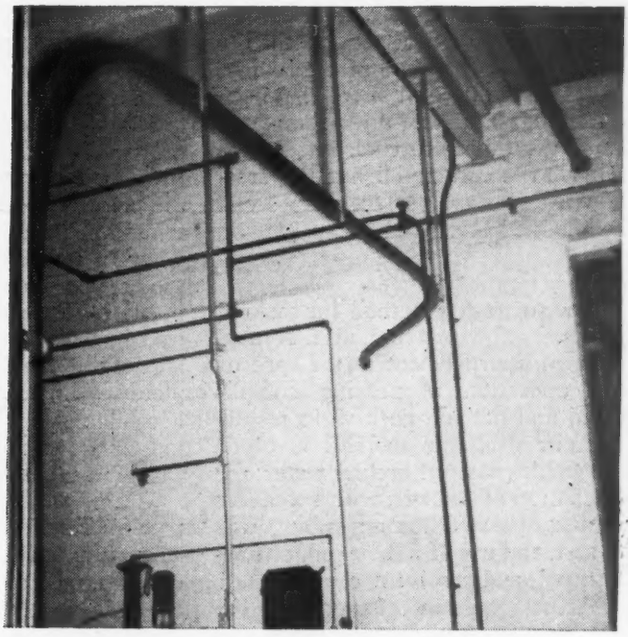
The tests demonstrated that liquids with a very high alcoholic content would affect the plastic, rendering it very pliable and drastically changing its shape. However, this was no drawback since the wines to be handled have a maximum alcohol percentage of but 24 percent by volume and at this concentration no ill effects were observed.

Characteristics of Tenite II were summarized, and the following effects were determined:

Heat—It resists immersion for a few minutes in boiling water, but for constant use of the pipe the optimum fluid temperature is around 100 deg. F. Expansion due to heat will then be negligible. In employing the lines at higher temperatures, it should be remembered that a fluid

... Then Crosses Open Areaway ...

Inverted-U hood protects the outdoor lines from the elements. Lines may be examined at any time from underneath.



... And Goes Up to Bottling Department

Lines readily bend to run in any plane or at any angle. Here, conduit curves smoothly from stanchion to wall.

temperature exceeding 140 deg. F. is not advisable.

At fluid temperatures below 40 deg. F. the tubing becomes brittle, but if not subjected to shock it can resist even 20-deg.-F. fluids without showing any deleterious after effects.

Acids and Alkalis—Up to a concentration of 10 percent, unfavorable reactions are practically negligible.

Foods and Beverages — Citrus juices, milk, and beer, as well as the wine, have little or no reaction on the tubing.

Pressure—At normal temperatures, depending upon the inside diameter and the wall thickness, a good tubing will withstand up to 1,200 psi. But if the temperature is excessive, maintenance of atmospheric pressure is recommended.

Tube Shaping

Plastic tubing may be coiled or bent to conform to almost any requirements. The suggested procedure was to immerse the tubing in boiling water or pass live steam through it until it is pliable. Immediate setting in the desired shape was then to be accomplished by chilling in cold water, while slower setting would take place through normal air cooling.

In practice, however, we decided against this procedure because we wished to avoid flattening in the bends. The method we decided upon and which was effectively tested in actual operation, is the following:

Take the section of tubing that must be shaped and close one end of it with a cork. Fill the tubing with fine dry sand, using great care to eliminate all possible air pockets. Then seal the other end with another cork. Now trace on the floor a precise pattern of the curve desired, and after having firmly secured one end of the tubing to the end of the pattern, take hold of the free end of the tubing.

Using a flexible hose connected to a steam pipe, carefully direct a stream of steam against tubing, working progressively from one end to the other until it becomes pliable.

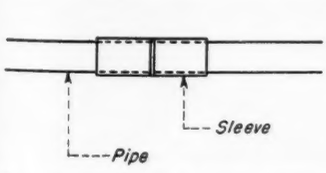


Fig. 1 - Sleeve-Joining of Plastic Tubing

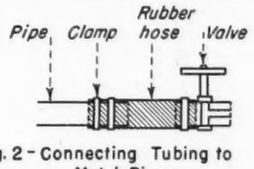


Fig. 2 - Connecting Tubing to Metal Pipes

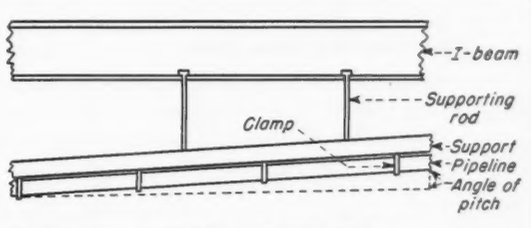


Fig. 3 - Layout of Pipeline on Proper Pitch

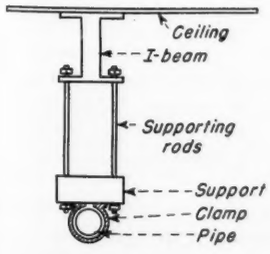


Fig. 4 - Indoor Pipeline Supporting Fixtures

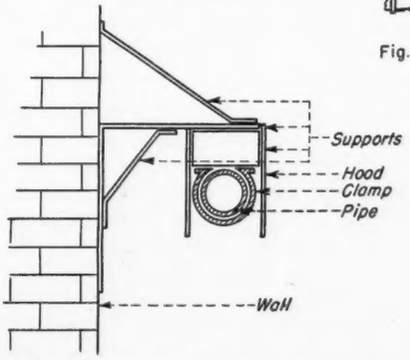


Fig. 5 - Outdoor Pipeline Supporting Fixtures

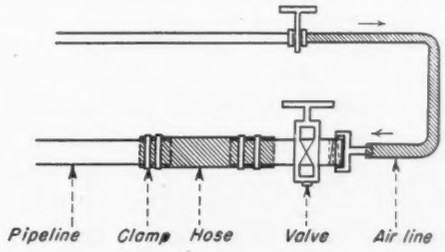


Fig. 6 - Hook-up for Air-Drying During Cleaning

At the same time, exert a gentle but steady bending pressure with the hand holding free end of the tubing.

When the desired shape has been obtained, shut off the steam and allow the tubing to cool. Afterward remove the corks and sand. Operating in this way, perfect shapes can be obtained as desired.

Joining

The suggested method for making joints in the pipeline also seemed open to improvement in the case of our operation. Appearing complicated and not too positive in results for our use, this method involved the employment of boiling water, the formation of sockets, with shoulders against which adjoining tubing was to rest, and use of a drift pin, or flaring tool, and a solvent cement.

Actual experience demonstrated to us that very satisfactory joints can be obtained as follows:

The two sections of tubing to be joined must present a level cut, absolutely flat and smooth. And an extra section or sleeve, of the same material but of a slightly larger diameter and of a length not exceeding 6 in., must be on hand. Now, a solution is made with shavings of tubing in acetone—to the desired consistency—and this liquid cement is evenly distributed over the inside wall of the sleeve with a brush and also on the extremities of the two sections of tubing ready to be joined.

The sleeve is first forced half way over one section, then the other section is joined, using a gentle rotating movement to eliminate air pockets. To complete the job, some more cement is applied at both ends of the sleeve, hermetically sealing them. In a very short time the cement hardens, and the two sections remain securely welded together (Fig. 1).

Connecting to Metal Pipes

The suggestion is advanced that by threading plastic tubing it is possible to connect it with metallic pipes or valves. While the job can be mechanically performed in this way, and looks all right on a cursory visual examination, it is not really satisfactory. This is because the coefficients of dilatability of metal and plastic material do not coincide, and as a result the joint is not perfect and intermittent leaks may develop.

A more feasible way of connecting plastic tubing with metal pipes consists in joining them with a piece of rubber hose securely fastened with ordinary clamps (Fig. 2).

After careful planning, a definite layout of the proposed pipeline is drawn, paying attention to the proper pitch required (see Fig. 3).

The method of suspension will vary according to the needs and to the limitations imposed by prevailing conditions. Fig. 4 shows an arrangement for pipes running inside the plant, while Fig. 5 illustrates another system suited for outdoor lines, where a protective hood shelters the pipe from the elements. In both cases the line is suspended from the support instead of resting upon it. This is preferable because it affords complete visibility. At regular intervals, hose clamps are inserted—somewhat loosely to provide room for the occasional expansion and contraction.

With installation completed, the pipeline should be tested under pressure for leaks, then subsequently cleansed with a lukewarm, mild solution of water and an alkali. Finally, there should be several rinsings with clear water.

Once in use, it should be drained, cleaned, and sterilized after each scheduled run of wine has been made. The following procedure is suggested:

1. With a proper arrangement, as shown in Fig. 6, inject compressed air into the pipeline, blowing it dry.
2. Wash with a tepid solution of water and potassium metabisulfite.
3. Again blow dry with air.

Today, translucent or transparent plastic tubing can be secured in straight lengths up to 12 ft. with a diameter up to 2 in. and a wall thickness of 3/16 in. or more. It can easily be cut with an ordinary sharp saw, then smoothed with sandpaper. And it can be threaded, joined and bent. In short, this material can be worked and machined more easily than most other rigid material. In addition, its handling does not require any special skill—a feature which greatly facilitates its uses and applications.

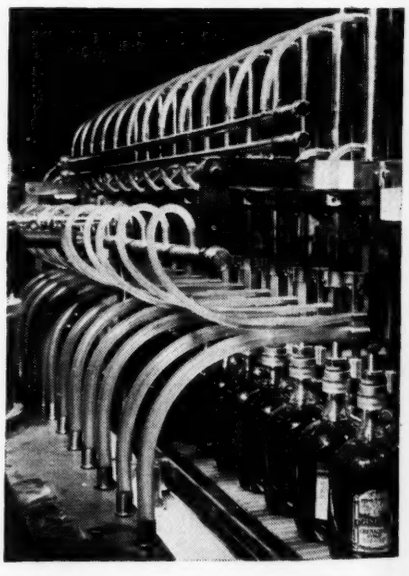
Beverage Filling Units Use Synthetic Tubing

Plastic tubing is flexible, translucent, non - corrosive

FLEXIBLE plastic Tygon tubing has many characteristics which make it promising for use in the handling of beverages and sirups. It is flexible, non-corrosive, translucent, non-toxic and has sufficient abrasion resistance to meet most processing requirements. The tubing is made by U. S. Stoneware, Akron, Ohio.

Its flexibility permits the tubing to be run in any plane or at any angle, and with a minimum of fittings. This feature is particularly desirable when it is necessary to run lines to and from equipment subject to vibration or actual movement. Being elastic, the tubing can be stretched over the fittings to form a tight leak-proof joint.

The non-corrosive characteristic is a positive requirement in many phases of the food field. Smooth surface and absence of cracks in the surface of the tubing minimize the possibility of contamination from accumulated material. Its ability to withstand steam for a limited time allows convenient sterilization of the tubing. Temperature working range is −50 deg. to 180 deg. F. These limits will satisfy a great portion of the food processing requirements.



TUBING is used in grenadine sirup filling at Castle Products, Inc., Newark, N. J.

Translucency, with a high degree of transparency, is another notable feature. The liquid passing through the tubing can be observed for any change in color. Maintenance of color correctness is important in foods, particularly from a sales angle.

Non-toxic qualities of the tubing are borne out by its extensive use in the medical field, where it is used for the handling of blood in transfusions and for intravenous feeding.

EDITORIALS

COMMENT AND OPINIONS

Much Ado About Nothing

IT has been a long time since the popular press has had a food subject which lent itself to such fright-writing treatment as bread made from Agenized flour. With no proof that the product had any effect on people, one writer whose article came to our attention played up opinions and suspicions to a degree that would make the average reader afraid to open the breadbox.

The damage done by such sensational writing is all the more regrettable because it apparently was unwarranted. Recent experiments by Dr. C. A. Elvehjem at the University of Wisconsin showed that dogs were not affected by a diet containing 30 percent flour treated with the amount of Agene normally used in milling. After more than eight months on this "normal" diet, the dogs were entirely normal.

Human feeding studies, in progress for some time, likewise have shown negative results. Even with the most refined measuring devices, investigators have been unable to detect any signs of harmfulness. So conclusive have been the results that the researchers consider it unnecessary to continue them.

The milling industry, however, plans to discontinue the use of Agene entirely as soon as possible. Research chemists have been making every effort to find a satisfactory maturing agent to replace nitrogen trichloride.

This change will not end the worries of the millers and bakers, however. Next they must repair the needless damage done by the fright-writers. This will involve a tough and expensive public relations job. And we don't envy the copy writers. They will have to find a way of telling the public that the product is safe without reminding them that the fright-writers said it was dangerous.

Give the Process a Break

TOO often the failure of a new and better process can be charged to the men operating it. They don't gear their ideas and habits to the new method, even though it offers great advantages in quality improvement and cost saving.

Consider, for example, the modern air-conditioned smokehouse. This equipment has paid big dividends in the hands of some processors. But there are cases where the operators failed to understand what makes the equipment tick and were too old-fashioned to take the trouble to learn. In this equipment, automatic control of the variable temperature-humidity smoking schedule is all-important. But the byproducts of smoking collect on, and desensitize, the control elements. Some operators take the time to maintain the automatic instruments in working order. Others don't, then they blame the smokehouse when the process goes haywire.

Successful use of automatically controlled processes of this type also demands that the product always be prepared in the same way. Sausage to be smoked should contain the right quantity and quality of ingredients. The automatically controlled smokehouse can bring out latent quality in the product but, of course, will not make up for deficiencies.

It has been difficult, it seems, for some of the old-time sausage makers to adjust themselves to automatic control. Convinced that sausage making is an art in which no two batches are ever mixed exactly alike, they are accustomed to compensating for mix variations by varying the smoking process.

Because of pressure to cut costs and produce uniformly good products, food processors who want to stay in business will have to adopt improved processes. And to make these processes work, they must understand their requirements and meet them. Management must see that this is done, otherwise they will be throwing progress and profits out the window.

Institutions vs. Homes

MANY food companies are finding it both necessary and profitable to study special requirements of the institutional customer. The most obvious difference between the needs of the institution and the housewife is in the size of package desired. But a number of firms are finding that other technical adjustments are needed.

Conditions of cooking in the institutional kitchen, whether it be hotel, restaurant, hospital, or boarding house, are quite at variance with those in the home. Mere size of cooking vessel at times makes the home item less acceptable in mass production. In other cases material which the institutional cook can bother with are unacceptable to Susie Smith who rushes in from her bridge club just ten minutes ahead of meal time.

Precision in food preparation in the institution is increasing, and discrimination in food choices is more keen. Furthermore, speed in home kitchen preparation now largely overshadows every other consideration in store choice of many items. Thus the urge for differential treatment has increased. All this is creating the necessity for reappraisal at all stages from raw material to final shipping package.

Not Like Mother Made

WHEN bread is on the table three times a day in practically every American home, the limiting factor of consumption is the palate appeal of the bread itself. Bread is at its best when it is oven fresh, but few there are, especially of the younger generations, who have ever tasted the delight of warm bread right from the oven. With the passing of baking from the home to the commercial bakery

something has gone out of American life that the baking industry would gladly recapture. If some way could be discovered to restore the lost gustatory delight, the consumption of bread would increase notably—also the consumption of bread spreads.

One way to approach the flavor of yesteryear is of course, to reduce the extent of use of power manipulation of doughs, but unfortunately hand work increases the cost of commercial baking to prohibitive figures. Another way is by the route of richer formulas, but that too, is costly. More rapid distribution is another approach to improved flavor of bread on the table, but in metropolitan areas the distances and traffic density preclude much progress on this line of attack.

There still is a potential opportunity for some one to solve the problem. It will not be easy, for the problem is very old and has long been studied by the experts.

Measure Before You Control

MOISTURE control in food plants is of utmost importance: in the food, in the atmosphere, even inside the operating equipment. Control at each such point is difficult, often impossible, until the moisture content can be measured rapidly enough to permit prompt adjustments.

This imparts particular importance to the new method for low moisture measurement recently developed at National Bureau of Standards. The new technic is one of great promise if applied by skilled chemists and engineers.

The method is based on the use of thin plastic film impregnated with phosphoric acid or other solution. The electrical conductivity of the film varies with the moisture content of the surrounding air or the material making contact with the film. Both speed and high sensitivity with very small samples of gas or material have been achieved.

The principles which lie back of this method are worthy of study. Quick and reliable measurement of moisture content is the first step toward automatic control.

"Measure before you attempt control" also applies to things other than moisture content. Sometimes we have to make empiric controls without quite knowing why they work. But control based on precise measurement gives better and more uniform process performance and product quality.

Ice Cream By the Pound

STATE legislatures and municipal governments come up every now and then with the proposal to require the sale of ice cream by weight rather than by the pint, quart, or gallon. The purpose is to protect consumers against excessive overrun, or ice cream which is nearly all air. Such "anti-inflation" legislation has voter appeal, but is both unnecessary and impracticable.

People eat ice cream by the dish, and the criterion of its value is how much they enjoy it. Since the eating quality is directly affected by amount of overrun, the consumer is his own best judge of the relative merit of different brands. If the ice cream manufacturer tries to economize by selling air instead of ice cream, he lowers the taste value of his product and loses business.

Retailers, too, know when the ice cream is excessively "inflated." The more the overrun, the more air is squeezed out in dipping the ice cream and the fewer the dishes or pints or quarts the retailer gets out of a can.

With this inherent protection, there is little need to complicate the manufacture and sale of ice cream and increase the costs in order to put it on a weight basis. It would be most difficult to make a particular flavor of ice cream with a uniform weight per gallon. Then various flavors of ice cream, sherbets, and ices vary in weight. Orange ice, for example, weighs about 40 percent more than vanilla ice cream. With present methods and equipment, then, the manufacturer would have to weigh the containers and stamp the weight on them. Which would mean more expensive man hours and higher prices. Retailers, too would have to weigh the cartons as they filled them from the bulk container.

Los Angeles once tried the sale of ice cream by weight. But in less than a year the practice was discontinued, and at the request of the druggists' association which had sponsored it.

Loss Leaders and Turnstiles

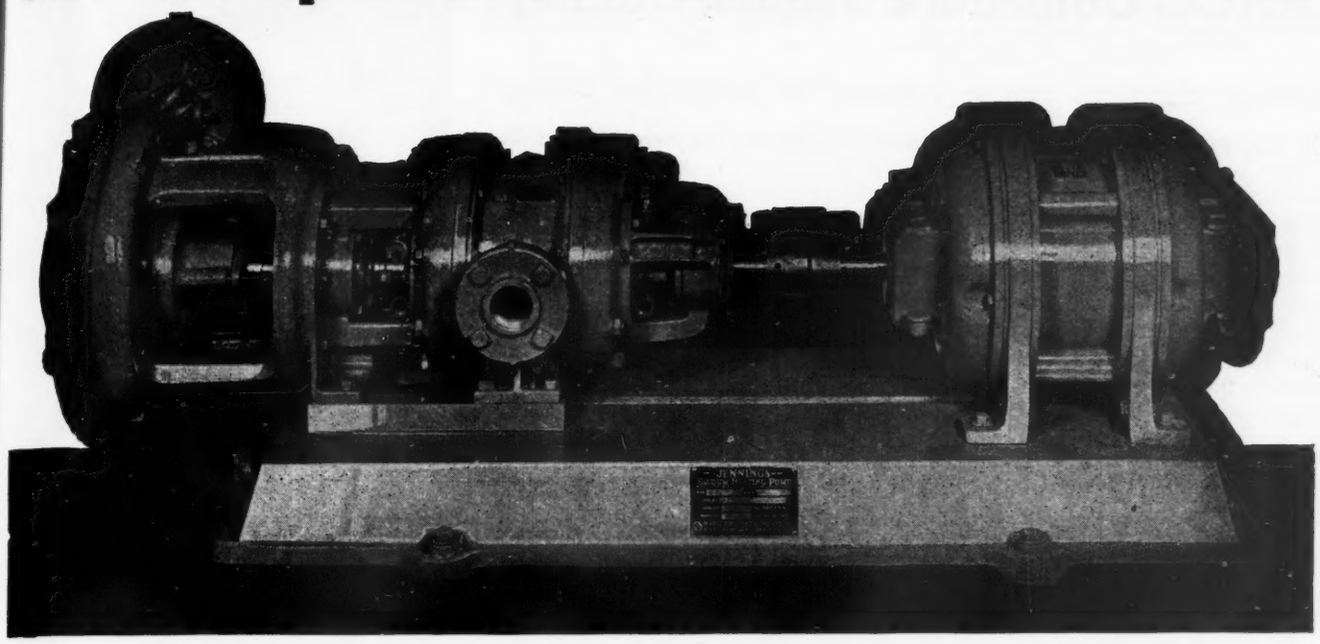
ONE of the smartest merchandising men in this country once said that if sales executives could listen in on the small chatter of the afternoon bridge parties they would quickly gain the answers to most of their selling problems. Such an opportunity came to us recently when a group of housewives sought the reason for different prices of the same item in different stores. We had cautiously suggested that a store may have been using the item in question as a loss leader. Immediately they insisted on knowing what a loss leader is.

They were told that it is a merchandising trick of marking down the price of an item to so low a figure that the store might lose money on the sale. The purpose, it was explained, is to lure the shopper to the store so that she will buy all of her groceries there. After being thusly enlightened, one of the ladies commented:

"Well, whoever figured that one out has the right idea. Once I go into a store I buy everything there, for I vow I will never wait in line behind the turnstile more than once in a single day. It's the most tiresome experience you can imagine. I wouldn't go to any other stores no matter how many loss leaders they have!" All the others were in complete agreement.

Yet there are many big store operators who continually harp on the unsolved problem of the cashier and the long delay in getting the women out of their stores with the family purchases!

Nash—the Perfected Vacuum Pump for Evaporators and Condensers

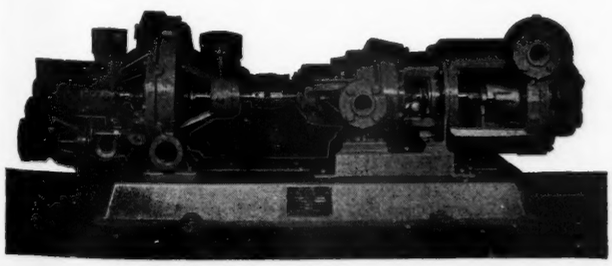


COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.



THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

NASH ENGINEERING COMPANY

SOUTH NORWALK · CONNECTICUT, U. S. A.

CONVENTION REPORTS

AACC Considers Grains, Baking

Cereal chemists center interest on materials. Haley is inducted, while Hildebrand becomes president-elect

PROBLEMS in grain storage, grain composition and nutritive value, flour aging and baking properties, enzyme activity and baking chemistry continue dominant for cereal chemists. This fact was indicated in the program of the 33rd annual meeting of the American Association of Cereal Chemists, held in Cincinnati, May 23 to 28, when registration reached nearly 500, and attendance was large at all sessions.

T. A. Oxley, Pest Infestation Laboratory, Department of Scientific & Industrial Research, Slough, England, described a proposed electrical method for determining the movement of heat through stored grain. He said that the movement of heat in grain is better understood than is the heat movement of water. The thermal conductivity of grain is also more complex than is conductivity of other materials.

Grain Changes

In discussing the biochemical and nutritive changes in stored grain, Lawrence Zeleny, Production & Marketing Administration USDA, reported that heat-damaged corn yields only about 40 percent as much starch as does corn properly stored. Water soluble protein, he said, decreases slightly during long storage, while other proteins increase slightly. He further declared that fats remain relatively stable in whole sound grain; that selenium content decreases, phosphorus content in phytin form increases, and other mineral contents are relatively unchanged during storage; that baking property of flour made from stored wheat improved during wheat storage, but at a slower rate than in stored flour under same conditions and that effect of grain storage upon vitamin content varied.

J. C. Gilman, Iowa State College, cited mold growths as primary causes of grain heating up to about 55 deg. C. These growths were, in part, responsible for changes in fat acidity through enzymic action upon fats in stored grain. Mold growths are dependent upon moisture content of the stored grain and relative humidity of the surrounding air. Mold control by chemical or heat sterilization is objectional if grain is to be used for seeding or to be fermented. Drying is recommended.

Steeping of Corn

John A. Wagoner, A. E. Staley Manufacturing Co., Decatur, Ill., explained the differences in steeping old and new corn in terms of the action of lactic and sulphurous acids. Lactic acid steeping softens the corn to permit water absorption, and the sulphurous acid steeping disrupts the corn protein cell structure to permit liberation of the starch. Sulphurous acid steeping becomes effective after the lactic-acid-steeped corn has a moisture content of about 45 percent, regardless of whether new corn containing 22 percent moisture or old corn containing 12 percent moisture is used. Less lactic acid steeping is necessary for new corn than for the old.

Roy L. Whistler, Purdue University, reported starch retrogradation studies and relation to bread staling in terms of amylose content of the starches. Corn and wheat starches, in 2 percent water suspensions at 0 to 1 deg. C., show rapid rate of degradation. Tuber starches, white potato, sweet potato, arrowroot and tapioca, respectively, degrade at slower rates. Waxy starch is most stable. Starches giving suspensions of lowest viscosity or greatest degree of hydrolysis have lowest rates of retrogradation. Relation between starch retrogradation and bread staling remained unproven.

B. D. Hites, University of Nebraska, explained differences in gelatinization properties of starches based on variations in amylose content, fatty acid content, and differences in molecular linkages.

Gelatinizng of Ten Starches

R. L. Gates, University of Nebraska, compared the gelatinizing properties of the natural starches on the basis of light transmission, water-holding capacity, total solids and

F. C. HILDEBRAND

amylose released by isoamyl alcohol precipitation and by iodine affinity in the temperature range of 40 to 100 deg. C.

These starches, in ascending order of gelatinization, are:

Wrinkled pea starch	Corn starch
Navy bean starch	Pink kafir
Rye starch	Waxy sorghum starch
Wheat starch	White potato starch
Barley starch	Cassava starch

His conclusion was that gelatinizing properties of starches are largely determined by species of plant source and that there is a correlation between rate of gelatinization and lipid content. Excepting the navy bean starch, starches with low lipid content show one-phase gelatinization and those with high lipid content show two phases with some degree of variation.

Period Study of Corn

M. J. Wolf, Northern Regional Research Laboratory, Peoria, Ill., reported studies made on three varieties of corn at five stages of maturity, ranging from 12 days after pollination to full maturity. Over this period, the starch content increased from 10 to 65 percent of the dry grain in waxy and non-waxy dent corn, and from 5 to 26 percent of sweet corn. He found that the water-absorbing capacity of the ungelatinized starch granules decreased from a high of about 0.8 gram of water per gram of starch at 12 to 13 days after pollination to less than half that 7 days later and that the most rapid changes in corn starch properties take place during the first 35 days following pollination.

Allan D. Dickson, University of Wisconsin Agricultural Experiment Station, found no apparent effect of indole acetic acid and naphthalene propionic acid growth inhibitors on grain germination, or malt composition, when used in barley steep or spray water. Naphthalene acetic acid, used at 200 ppm., reduced rootlet development and increased malt recovery by about 2 percent, when used in steeping Oderbrucker barley. Malt extract, diastatic power, or amylase and wort nitrogen/malt nitrogen were also slightly decreased. This growth inhibitor had less effect upon Wisconsin Barbless barley. Naphthalene acetamide gave slight increases in malt extract and wort nitrogen/malt nitrogen over the controls.

Limit-Dextrinase

Eric Kneen, Kurth Malting Co., Milwaukee, identified an enzyme capable of hydrolyzing a low-molecular, non-fermentable dextrin residue from alpha- and beta-amylase action on starch. To be known as "limit-dextrinase," it is not found in barley but in malt, indicating that it develops during barley germination.

Sutton Redfern, Fleischmann Laboratories, New York City, described and explained construction and operation of an automatic electrical recorder for measuring pressure of gas produced during fermentation. It is adaptable to use in dough fermentation, yeast growing and measurement of enzyme activity.

R. L. Gates, Kansas State College, outlined method of fermenting glucose selectively in presence of maltose by a dehydrated yeast. Removal of glucose permits determination of maltase activity of mold brans using *Asperigillus oryzae* and *Aspergillus niger*.

B. M. Dirks, Kansas State College, reported on 29 adsorbents studied to control action of proteolytic enzymes developed in mold bran and in malt that give undesirable effects in bread doughs. Sodium chloride (4.5 M.) used at pH 10 gave best results with 80 to 90 percent reduction in proteolytic activity of mold bran and malted barley and wheat enzymes. Bacterial proteolytic enzymes are only slightly affected by the adsorbents studied.

Medalist Tells of Research

In her Thomas Burr Osborne Medal acceptance address, Dr. Betty Sullivan, vice-president and director of research, Russell-Miller Milling Co., Minneapolis, reviewed her research studies to determine the mechanism of the oxidation and reduction changes in flour during aging.

Her studies were to identify the role that starch, lipids and protein play in the flour aging process. The studies also included the use of bromates, iodates and nitrogen trichloride as chemical oxidizing agents to overcome the "greenness" or unworkability of new flours. Reducing agents intensify the greenness attributed to new flours in an under-oxidized state. It was found starch was not a factor, on the basis that the flour amylases are not involved.

Lipids were found to play a part, but not to be the sole constituent of the flour involved. They were studied in association with the flour proteins, with the result that attention was focused on the sulphur groups of the proteins, particularly the disulphide cross linkage groups.

AACC Officers

1947 President-Elect, William L. Haley, Fisher Flouring Mills Co., Seattle, Wash., was inducted into office as 1948 President of the association.

Dr. F. C. Hildebrand, Products Control Dept., General Mills, Inc., Minneapolis, was announced to be 1948 President-Elect, and George T. Carlin, Swift & Co. Research Laboratories, as 1948 Treasurer.

1949 Meeting is to be held at the Pennsylvania Hotel, New York City.

Federation Promotes Flour

Long-range program to increase domestic consumption of all wheat flour products takes shape at convention

PROSPECTS for improved world crops and less demand for wheat exports were given consideration at the 46th annual meeting of the Millers National Federation held at Chicago, in May.

These prospects offer the milling industry an opportunity to launch its long-range program, early this fall, to increase domestic consumption of wheat flour products, declared John L. Locke, federation president.

The program, described by Mr. Locke as the industry's answer to the downward trend in present wheat consumption, includes:

(1) National advertising, (2) publicity and public relations, (3) educational and professional projects, (4) trade campaigns for grocers and bakers, and (5) sales promotional materials for merchandising events.

It received the unanimous approval of the federation's board of directors during the three-day meeting, and it is now established as a permanent part of the federation's activities. Sufficient funds are available to carry the program through 1949. Additional accruals and grants, to assure continuation of the program, are expected to be made by individual companies during 1949.

The Board also approved recommendations by the Technical Advisory Committee for appropriations, which provide: (1) A $10,000 grant for support of the flour milling engineering course at the University of Minnesota, Minneapolis, assuring a six-year guarantee of its continuation; (2) the sum of $5,000 to Kansas State College, Manhattan, Kan., to continue wheat flour granulation studies; (3) the sum of $5,000 for wages to be incurred in installing new machinery in the student training mill at Kansas State College; and (4) payment of $3,000 for the second year of its 10-yr. commitment to the support of *Biological Abstracts*.

"First Concern"

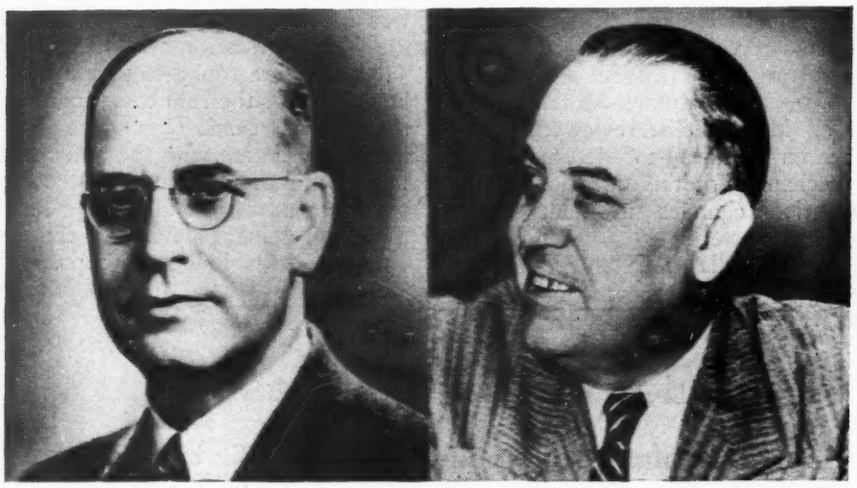
In his discussion of millers' problems concerning foreign and domestic supplies, Locke emphasized that domestic flour business is the first concern of the milling industry. Citing the unfavorable trend in domestic consumption of flour in recent years, he said that per capita consumption has declined from more than 200 lb. yearly to 137 lb. since the war. Although much of the decline can be attributed to conditions over which the miller had no control, increasing competition from other food products has also contributed to the decline. The long range program was therefore organized to meet these competitive factors in domestic food consumption.

In his talk concerning flour export prospects, A. B. Sparboe, Pillsbury Mills, Inc., Minneapolis, told millers that a committee representing the industry had pressed strongly for the immediate return of general ex-

port license in the Western Hemisphere and Philippine Islands. He said government license arrangements have limited those exports, and a return to general license for the milling industry is appropriate at this time.

The matter is receiving consideration by government agencies, and Sparboe advised members of the industry to make every effort to assure a favorable decision early this summer.

M. F. Mulroy, executive vice-president of Russell-Miller Milling Co., Minneapolis, advised millers that many aspects of the international wheat agreement are unfavorable to the U. S. He offered detailed reasons, which he declared made the agreement unworkable.



Ralph W. Bouskill, Purity Flour Mills, Ltd., Winnipeg, Can., (left) succeeds Dewey Robbins, Fisher Flour Mills, Seattle, Wash., as president of the Association of Operating Millers.

Millers Want Machinery

Operating group, in annual meeting, asks higher standards and better control over grain infestation

NEED for essential changes in wheat milling machinery and equipment to insure higher standards in mill sanitation and more effective control over grain infestation was given emphasis in a realistic presentation of milling problems at the 52nd Annual Meeting of the Association of Operative Millers, May 17 to 21, in Chicago.

Modernize Mills

Flour mills must be modernized if they are to meet the more critical standards of sanitation and the production demands of today, declared Dewey Robbins, association president. He said advancements in milling technics, more efficient machinery, and new methods of product handling must be studied and applied. He pointed out that educational opportunities are being provided by the association through its program of short milling courses and regional correspondence courses to assist millers in solving their technical problems.

An all-day symposium was arranged by the program committee to inform millers of recent developments in pneumatic handling and shipment of flour, granular material and pulverized food products.

Flour-Handling Method

David N. Finnie, National Fitch Co., New York City, explained a new method of flour handling which includes: (1) Bulk transportation of flour from the mills in specially constructed tank cars, (2) transfer of flour from the cars to the bakery or terminal by traveling suction nozzle, and (3) bulk storage facilities at the point of delivery.

This system was reported as having sanitation advantages over conventional methods of handling and conveying, and as being less expensive and more efficient. Bag storage and dumping is eliminated, and dust contamination and product loss is greatly reduced. Over all savings have been estimated at between 25 and 30c per cwt. The system is a coordinated development of National Fitch Corp., New York City, and the Fuller Co., Catasauqua, Pa.

Low Pressure Piping

Dustless conveying of flour through pipes by air activation was described by E. C. McDowell, of Robinson Air Activated Conveyor System, New York City. He explained two systems now being used: (1) Low pressure—high volume, and (2) low pressure—low volume. Finely pulverized materials (such as wheat flour) which have a tendency to pack are "air-fluffed" and lighted to form a mixture of air and solids by application of compressed air in a pressure vessel or "air activator."

The Tote Engineering System of bulk flour handling was explained by Roy A. Robinson, of General Mills, Inc., Minneapolis. Bulk shipments of flour are made in either plywood or aluminum containers that measure 42 x 48 x 68 in. Capacity of each container is approximately 3000 lb., and empty weight of the box is 250 lb. Boxes are fitted with a circular-opening, interrupted-screw-type cover and are filled by a 15 cycle per min. power driven spinner.

R. M. Carrier, Whitley-Carrier Co., Aurora, Ill., described a horizontal trough conveyor which is activated by a belt drive under the trough. Manufactured in sizes from 5 ft. to 100 ft. in length, its conveying time is given as 120 tons/hour. Material is activated by a vibratory movement imparted to the trough. By application of the same principle, a vertical spiral type conveyor was also developed which can feed material on a vertical plane at the rate of 3 cu. ft./min. It is said to be adapt-

(*Continued on page 207*)

Officers Named

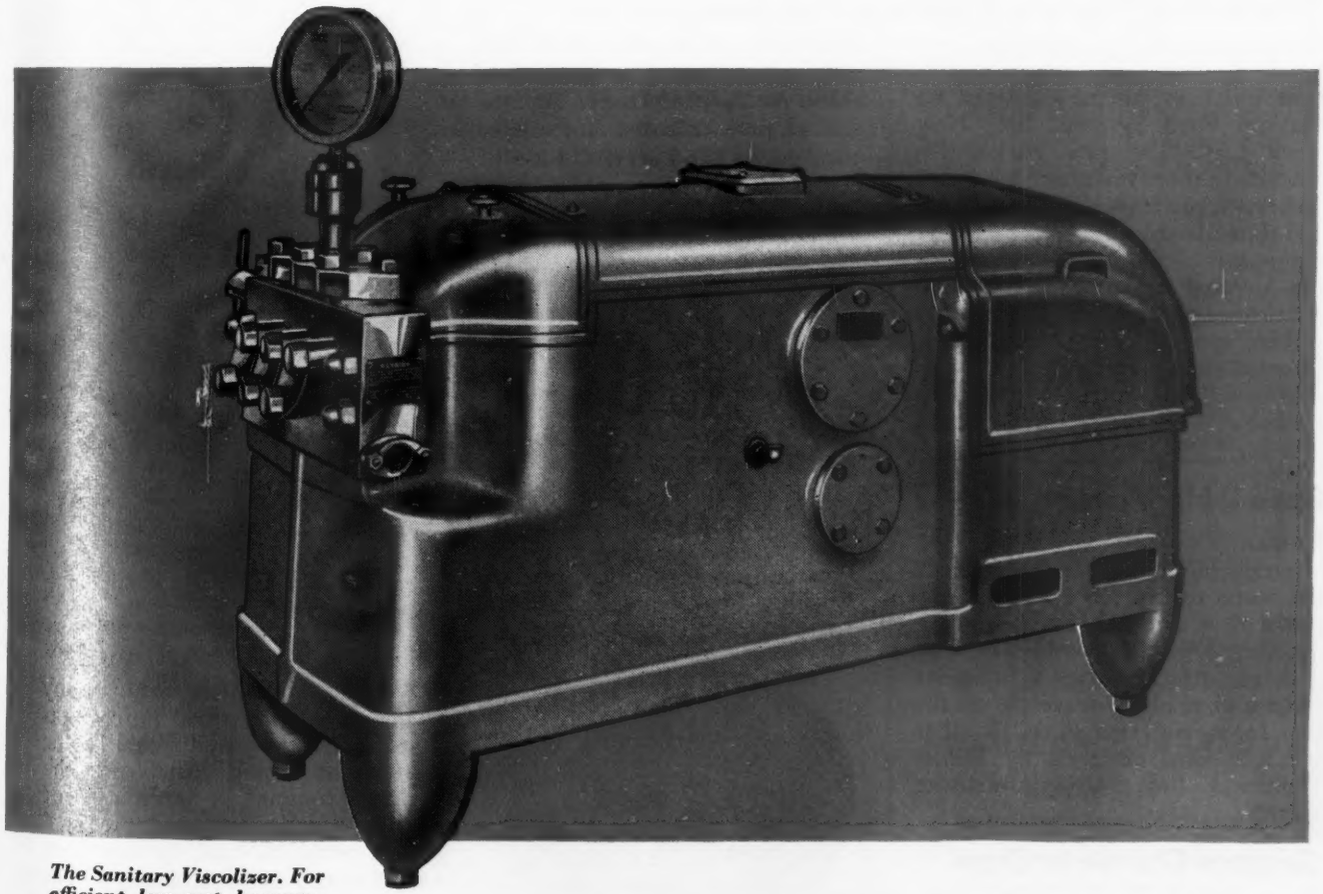
Ralph W. Bouskill, Canadian operative miller and general superintendent of Purity Flour Mills, Ltd., Winnipeg, Man., Can., was elected president of the Association of Operative Millers, succeeding Dewey Robbins. Other officers are: Vice-president, Otto J. Zimmerman, divisional superintendent, General-Mills, Inc., Oklahoma City, Okla.; treasurer, Herman H. Trapp, Russell-Miller Milling Co., Minneapolis; and secretary, Donald S. Eber, Kansas City, Mo.

for the taste that sells... Homogenize

The trend toward homogenization of liquid food products in the Sanitary Viscolizer is more than a trend—it's a fact! Behind it is the simple reason that homogenization means a smoother, better-tasting product, the *kind that gets and holds customer preference.*

No new, untried machine, the Viscolizer is the original sanitary homogenizer, long a leader in an important component of the food industry. Sanitary to the highest degree. Efficient and simple to operate, it easily adapts itself to a wide variety of food processing operations.

Why not take advantage of the trend toward homogenization before you wish you had? Call in and talk with a Cherry-Burrell representative about a Viscolizer for your plant, soon.



The Sanitary Viscolizer. For efficient low-cost homogenization of liquid food products. One of a wide variety of models.

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trendmaker in a great industry

NEW PACKAGES & PRODUCTS

Wife-Saving Meals in Aluminum Foil Bags

SINGLE SERVINGS of precooked frozen food, packed in sanitary, aluminum foil bags, are now offered by Maxson Food Systems, Inc., New York City. The new packages—containing roast veal, beef pot roast, turkey, diced creamed potatoes, peas, and lima beans in butter—are an outgrowth of the company's "Meal-On-A-Plate" product, now in use on airlines and railroad dining cars.

The company cooks the food, freezes it and inserts it into the aluminum foil envelope-type containers. In home preparation, the unopened frozen container is placed in boiling water, hot oven or pressure cooker (whichever is preferred), for the length of time indicated on the label —then opened and served. Fuss of preparation and mess of cleaning up is saved the housewife.

Present distribution is in the New York City, Richmond, and Washington areas. Further expansion into eastern markets is planned. Reynolds Aluminum Co., working with Maxson engineers, developed bags and labels.

Spee-D-Mix Successor

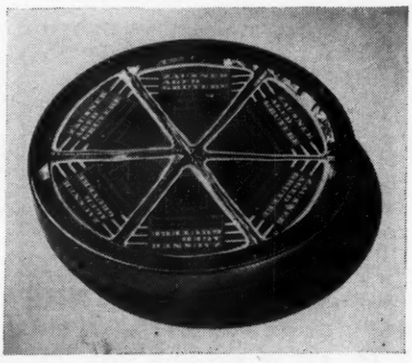
ROMAN MEAL Co., Tacoma, Wash., is producing a new pie crust under the name of Speedy-Crust as successor to a similar product it introduced in 1932 as Spee-D-Mix. The package—which carries a full-color picture of ready-to-serve pie on the two faces, and recipes on all other surfaces—was designed by Milne-Heffernan, Inc., Seattle advertising agency.

Gruyere Cheese in Cans

A NEW tin plate container for packaging aged gruyere cheese is reported by the Can Manufacturers Institute. It is a round, flat can with a telescoping lid in which an acetate disc has been inserted for visual inspection by the consumer.

Individual portions of cheese in the can are wrapped in gold foil with blue, white and black labels. The packaging motif of the can is further carried out by gold lacquering.

Zausner Foods, Inc., Harrison,



N. J., packer and designer of the new product, state that consumer response has been outstanding. Distribution is nationwide.

Pink and White Icings

POWDERED FROSTINGS, vanilla and strawberry flavored, have been introduced by the Virginia Dare Co. One 8 oz. jar contains sufficient mixture to cover top and sides of a 9-in. layer cake or 20 large cup cakes. It is suggested for use on layer cakes, cup cakes, buns and pastries.

Preparation consists of adding and stirring the indicated amount of water—more for thinner icings, less for thick. Result is a smooth, glossy icing of good flavor and texture.

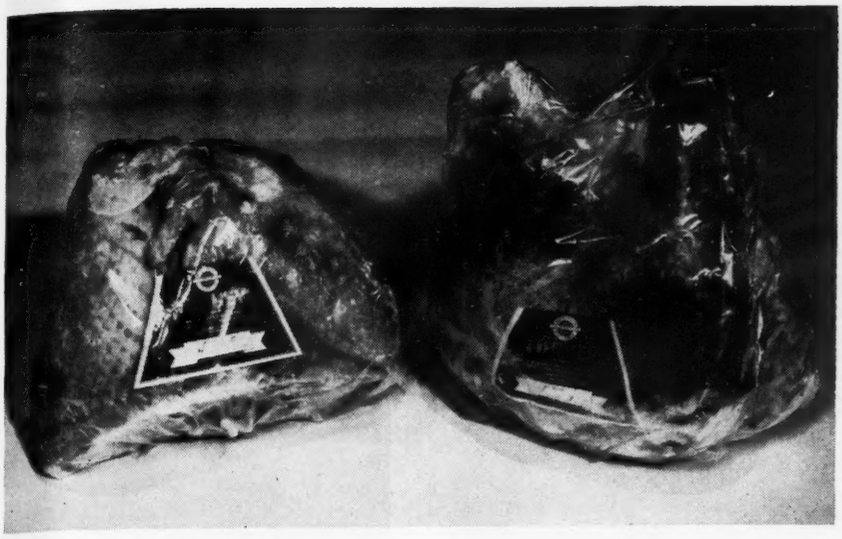
Mexican Dinner by Mail

VALLEY CANNING Co., Canutillo, Tex., specializing in canned Mexican-style foods, is introducing a new consumer package containing ingredients for a Mexican enchilada dinner serving six persons. After a period of research, the processor developed the package specifically for filling mail orders throughout the world. A sizable market has been

attained from orders sent in by members of our Armed Forces stationed outside the continental limits.

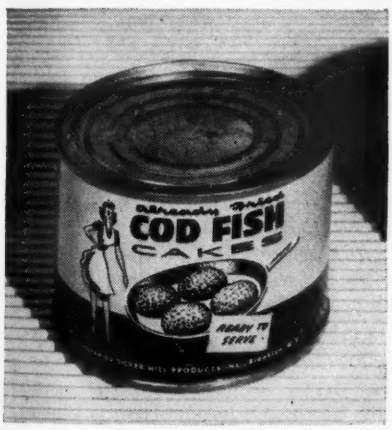
Made of strong pasteboard, the package contains a large can of tortillas (about 30) made from a typical recipe as used by American and Mexican Indians, a can of enchilada sauce with its piquant flavor, and a can of pinto beans. Complete directions for preparing the meal are enclosed.

A direct consumer sales program has been launched. Distribution is also planned through regular wholesale and retail channels.



Frozen Gobblers Available in Fourths

HAVING tested the market in Seattle, the Washington Cooperative Farmers Assn. is introducing frozen quarter turkeys wrapped in cellophane. The product was developed in cooperation with market research specialists at Washington State College. The Co-op's processing plant was featured in Feb. 1948 FOOD INDUSTRIES.



Prepared Codfish Cakes

SILVER HILL PRODUCTS, INC., Brooklyn, N. Y., has introduced a 10 oz. can containing cod fish cakes already fried and ready for use. Product is made from codfish, potatoes, vegetable oil, bread crumbs, whole egg powder, salt and spices. Label is two tone yellow and brown with a blue skillet illustrating simplicity of preparation for eating.

Vitamin-Chocolate Sirup

NEW TYPE chocolate sirup packed in small metal cans for home consumption is the newest chocolate product packed by the Walter Baker Co., a division of General Foods Corp. According to the manufacturer, this is the first sirup to combine vitamin enrichment with complete retention of chocolate flavor.

Each can contains 16 oz. of the flavorsome sirup, which is intended for use with milk as a booster to provide extra nutrition. Added to the product are vitamins A and D, thiamine, riboflavin and niacin. Iron, calcium and phosphorus are also provided.

The can is lithographed in attractive colors, and it bears the familiar Walter Baker trademark.

Vegetable Juice Drink

S & W FINE FOODS, INC., has added Vegetable Juice Cocktail to their line of canned juices. Packed in a No. 211 size tin with 12 fluid oz. net contents, the drink is a blended mix of the juices of tomatoes, carrots, celery, parsley and lemons, with salt added.

Label is of two shades of green,

For DEPENDABLE protection against insects...

Keep food-processing and food-handling machinery insect-free with ACRYLON* Spot Fumigant. Highly toxic to all insects, ACRYLON is poured into machines where infestation normally builds up most quickly. Relatively short exposure is required, and regular applications will keep machines insect-free at all times.

ACRYLON vaporizes completely, leaving no residue. It will not clog machinery nor harm food products in any way, and it is non-flammable.

ACRYLON is economical, too. A few ounces in each danger spot assure complete insect kill. Available in 15-gallon and 50-gallon drums.

For Thorough Building-Wide Insect and Rodent Control

specify AERO* LIQUID HCN Fumigant. Use it periodically with in-between applications of ACRYLON to strategic spots to assure constant pest control in food plants.

*Reg. U. S. Pat. Off.

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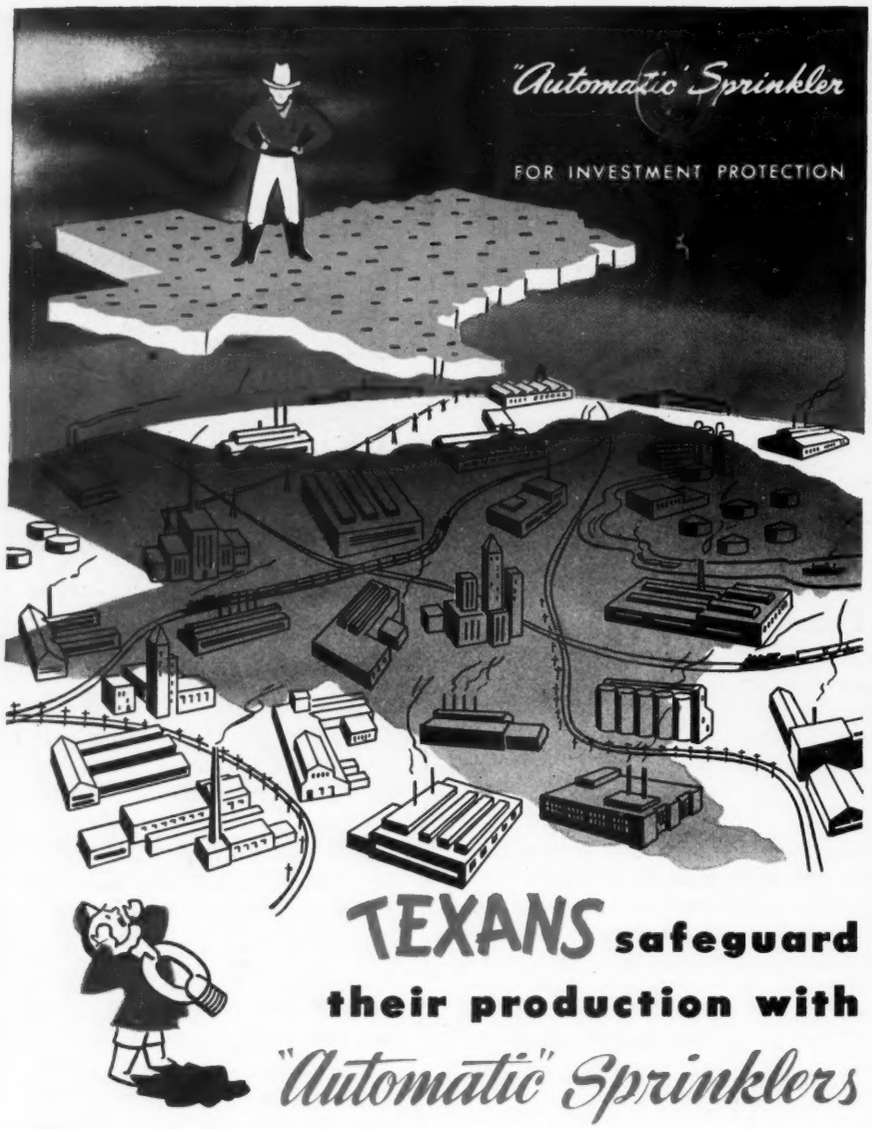


TEXANS safeguard their production with "Automatic" Sprinklers

AMERICAN INDUSTRY, owing to its constant expansion and development, presents to business management a definite challenge—a distinct opportunity. Yet business survival is dependent upon continued operation, and the menace of fire and its resulting destruction is always prevalent.

That leads us to the often asked question—"What makes a structure fire-safe?" It is well to keep in mind that you are not completely safe just because yours is a so-called fireproof building. Modern construction alone offers practically no protection. Fires that daily occur in such properties are mute evidence to the fact that a structure is only as fireproof as are its contents. Unfortunately, many realize too late the important role being played by "Automatic" Sprinkler in safeguarding American industry. Recorded statistics on the effectiveness of "Automatic" Sprinklers prove them to be industry's most effective weapon against fire . . . the very backbone of any good safety system.

These facts are the reason why thousands of business executives, not only in Texas, but throughout the country at large, specify "Automatic" Sprinklers for both old and new construction. They look upon them as their first line of fire defense, *an important investment today . . . perhaps welcomed protection tomorrow.*

"Automatic" Sprinkler

FIRST IN FIRE PROTECTION

DEVELOPMENT · ENGINEERING MANUFACTURE · INSTALLATION

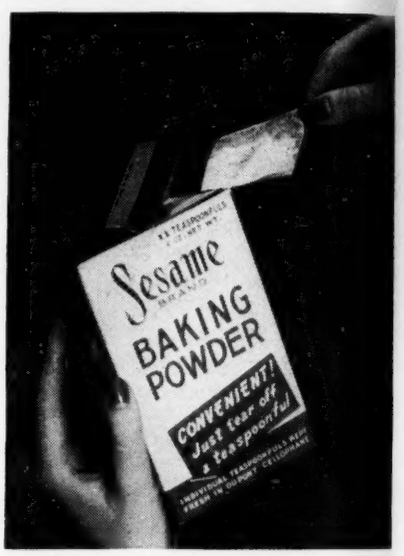
"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO
OFFICES IN PRINCIPAL CITIES OF NORTH and SOUTH AMERICA

with predominant white lettering and colorful illustration of vegetables used in processing.

Main office of manufacture is San Francisco, and warehouses are throughout the country. Distribution is nationwide.

Tear Off a Teaspoonful

NEW TYPE package for baking powder has recently been introduced by the Cellophane Div. of E. I. du pont de Nemours & Co. Instead of being loose in the package, powder is contained in a cellophane ribbon in premeasured quantities.



Sections of the folded, continuous ribbon, which feed out through a slot, can be torn off on a serrated metal edge. In addition to convenience for the housewife, the moistureproof Cellophane helps protect the baking powder from deterioration.

M. C. P. Pectin Repackaged

JAM AND JELLY PECTIN is being packaged by the Mutual Citrus Products Co., Anaheim, Cal., in a new colorful 3½ oz. carton to replace the 3 oz. container in use last year. Production costs will necessitate a price increase, but the makers claim the new M. C. P. to be a better buy—not only because of greater

volume (most competitive brands are 2½ oz.) but also because of the comparatively greater jam and jelly yields afforded, weight for weight.

Gum With Novel Wrap

BUBBLE GUM with a trick wrapper that can be used to transfer a design onto the skin has been introduced by Topps Chewing Gum, Inc., Brooklyn, N. Y. The gum is named

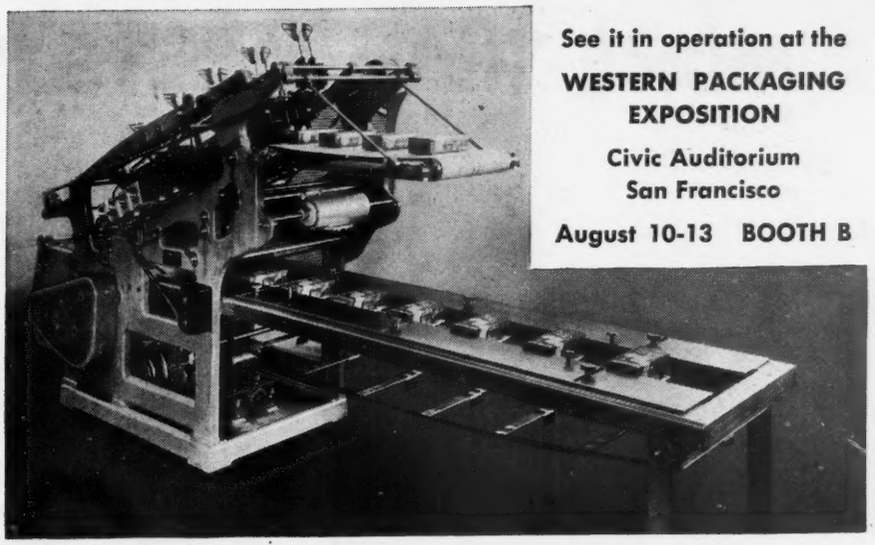
"Tatoo." Reverse side of the gum wrapper is applied to moistened skin. One hundred tattoo subjects, such as pirates, clowns and airplanes, are included in each box. Transfers are removed from skin easily with ordinary soap and water.

The new gum is foil-wrapped and packaged in a red-and-green striped circular box of 5 in. dia. and 2½ in. high. Gum comes in six colors—red, blue, green, yellow, orange and purple.

Wrap for Self-Service Items

SARAN FILM, manufactured by Dow Chemical Co., is now available for many types of food packaging. The

film's toughness, low moisture permeability, flexibility and clarity are properties which make it adaptable for packing pickles, fruits, cheese, meat products, and the like.



See it in operation at the
WESTERN PACKAGING EXPOSITION
Civic Auditorium
San Francisco
August 10-13 BOOTH B

A New

VERSATILE

CELLOPHANE WRAPPING MACHINE

This new model, which made a decided hit at the recent Packaging Show, is an extremely versatile yet compact wrapping machine. And it is moderately priced.

The Model F occupies only 13' x 4' of floor space. It will wrap cartons, goods in trays, open boats, flat cards or U-boards. Handles sizes from 3¾" to 16" long, 2½" to 7½" high and ⅜" to 6" wide.

Self-measuring paper feed

Incorporating the most modern principles of design, the Model F offers an exclusive self-measuring paper feed, which makes it possible to wrap trays in which the goods vary greatly in height. It therefore lends itself to the wrapping of vegetables, fruit, meat, baked goods, etc. No adjustment is required for the width of the package being wrapped, and all other changes can be taken care of in from 5 to 20 minutes.

End fold of wrap can be made to come on end or under package, as in the case of goods on a cardboard.

May be equipped with our Thermo-Print-Labeler which prints date, price, name of product or other information on label and seals it to top of package.

Write for complete information

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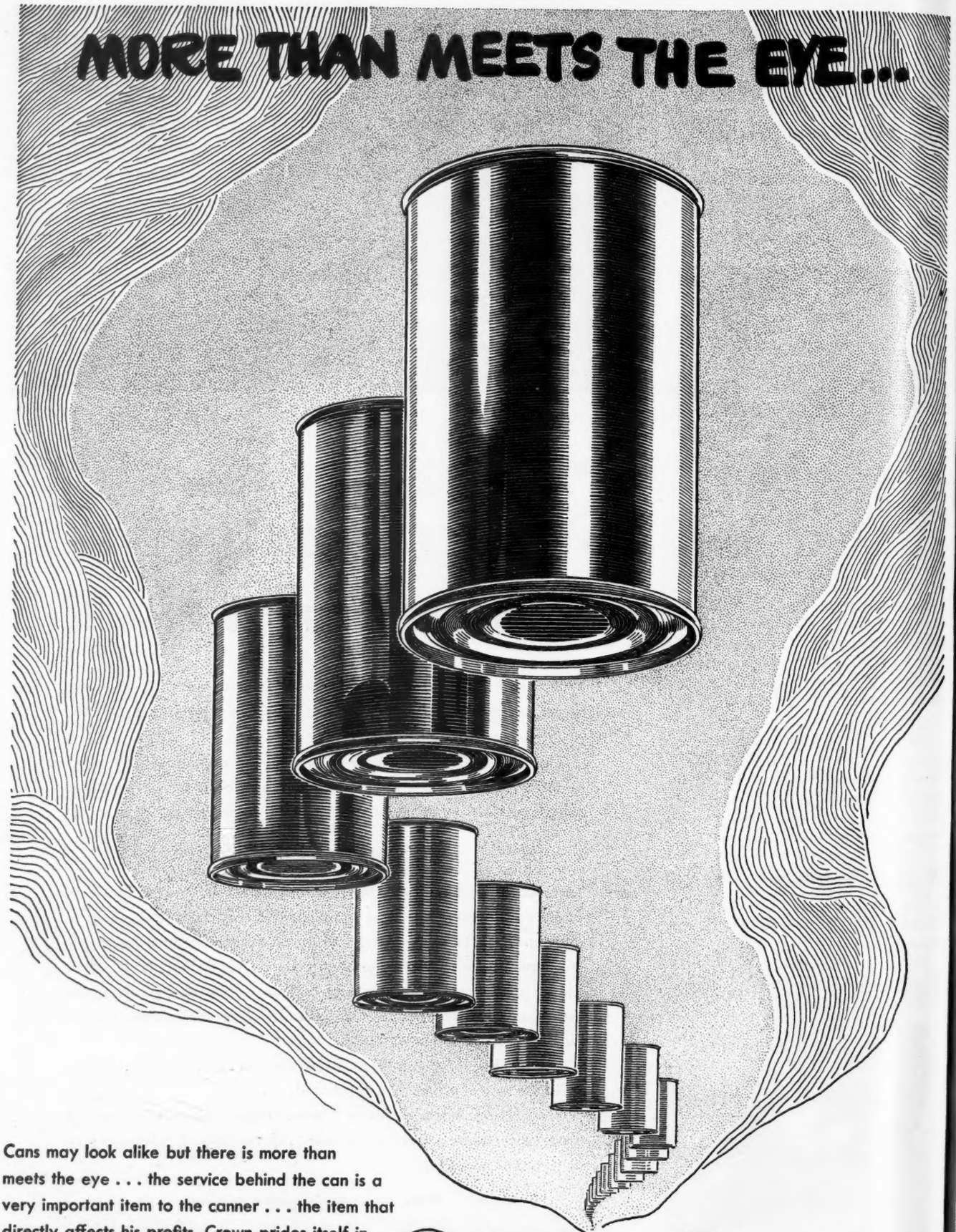
LOS ANGELES SAN FRANCISCO SEATTLE TORONTO

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

MORE THAN MEETS THE EYE...



Cans may look alike but there is more than meets the eye . . . the service behind the can is a very important item to the canner . . . the item that directly affects his profits. Crown prides itself in its service. It pays to deal with Crown.

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FOOD INDUSTRY NEWS

Freight Rate Changes Require Careful Study by Food Shippers

The full answer is not yet available, but the new charges alter the highly competitive picture in food distribution

THE latest in a series of temporary and permanent freight rate increases granted to the railroads last month (May) has again raised questions. How these postwar freight increases change the cost relationships between competing processors in the food industry no one knows for sure.

Perhaps more important than the commodity rate increases, shown below, are the area differentials, which are being granted by the Interstate Commerce Commission, to offset higher operating costs and relatively lower revenues of roads in certain sections of the country.

Thus rates on shipments within the eastern territory are now 30 percent above Jan. 1, 1947; whereas, they are 25 percent higher within the Southern territory and Zone I of the Western Trunk-line territory; and only 20 percent higher within the other territories.

Also rates on shipments between territories are up only 25 percent higher than Jan. 1, 1947. (Note: intra-state rates aren't involved; they are not under I.C.C. jurisdiction. Generally though, they go up in about the same amounts as interstate rates.)

Just as exceptions are made for industrial raw materials, so are other kinds of exceptions made. On many commodities, including some foods, maxima or "hold downs" are set.

These maxima are a sort of ceiling. The railroad is permitted to increase its freight rates on the specified item by, let us say, 20 percent. But I.C.C. also rules that the road cannot increase the total freight charge by more than so many cents per unit of weight (20 cents per 100 lb., for instance). Thus the maximum becomes a ceiling that holds down the actual freight charge, especially on long hauls, where a percentage freight increase hits hardest.

In general, the maximum tends to preserve the previous freight-cost relationship of competing shipments arriving in a market area from long, but varying distances. For instance, they tend to preserve the relationship on shipments of fresh fruits and vegetables coming into New York from Florida on the one hand, and California on the other.

On such long hauls, a straight percentage increase in rates would push the actual freight charge per box above the specified figure, which I.C.C. says is the maximum increase it will allow.

The setting of the maximum, therefore, helps preserve the existing competing relationship between the two areas, as far as freight charges are concerned.

The case of "food products in cases or packages," however, is different. Both the California and Florida packer, for example, are being charged the same percentage increase, with no maximum or "hold-down" in effect. Thus, when it comes to competing in the eastern markets, the West Coast packer is at a new disadvantage under the across-the-board increase in relationship to a competing mid-Western packer shipping to the same market.

In a word: across-the-board percentage increases tend to intensify the difficulties of a producer trying to compete in distant markets, where freight in itself makes it hard to compete anyway.

Average percentage increase in freight rates over June 30, 1946 for certain food commodities and products

All grain	39.6%
Grain products, edible	42.0
Fresh fruits	35.4
Fresh vegetables	34.3
Fresh meats	50.4
Processed meat products	49.0
Eggs, butter and cheese	49.3
Cottonseed oil	48.8
Soybean, vegetable, & nut oil	49.2
Wine	49.8
Malt liquors (beer)	49.9
Sugar	48.9
Food products in cans, packages	52.8
ALL RATES, food, nonfood	42.9

Award to AMI

AMERICAN Meat Institute, Chicago, has been named recipient of the annual award for outstanding services to the meat packing industry for the seventh consecutive year, in the 1947-1948 Awards Contest, held by American Trade Association Executives.

The national contest was the 13th of its kind sponsored by the association to recognize service to industry, service to the public and industrial development by large national associations and regional, state and local organizations.

Wide World

DUST BARRIERS GROW IN NEBRASKA

This ten-row shelterbelt, protecting a Nebraska farm, is a mile long and is typical of the barriers, totaling about 300,000 trees, planted in the prairie states since 1940.

Pillsbury Borrows To Expand and Modernize

PILLSBURY MILLS, INC., Minneapolis, Minn. has borrowed $12,000,000 on its 3¼ percent promissary note from New York Life Insurance Co. to increase its working capital and provide for general corporate expenditures. The note contains provisions for sinking fund payments and matures in 1968.

Proceeds of the borrowed capital are intended to implement the firm's long-range program of industrial modernization and product improvement, which has been given impetus in recent years under Philip W. Pillsbury, president.

Corporate developments have already been made which include: Streamlining of the firm's administration organization; addition of the flour milling, grocery products and grain divisions; product diversification; research in new uses for grain products; and organization of a modern program of employee and community relations.

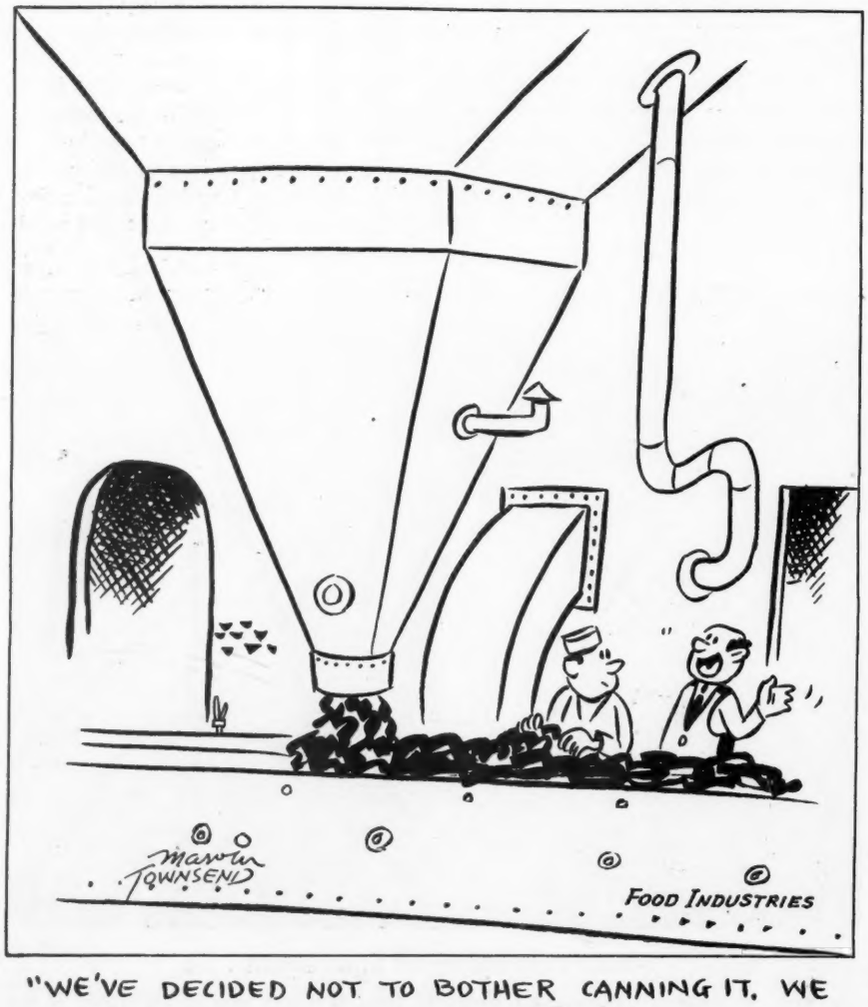
Two company plants are nearing completion in Los Angeles, Calif. and Springfield, Ill. A new feed mill and grain elevator in Los Angeles will have a capacity of 1,200,000 bu. In Springfield, a pre-mix plant will supply prepared mixes to bakeries, hotels and institutions. Another feed mill was completed recently in Lima, Ohio and an addition made to the soy bean refinery in Clinton, Iowa. The company has also acquired a 1,300,000 bu. grain elevator in Davenport, Iowa.

More Research

Research expansion includes plans for a product development and research laboratory more than double the size of the present laboratory. In addition, a pilot plant is being built for testing manufacturing methods and applying laboratory findings to the manufacture of products.

In the product development field, a new series of mixes has been produced, the most recent being a pie crust mix and a hot roll mix. Others are under consumer tests. New labels, based on the company's famous "barrelhead" trademark have also been adopted.

Modern employee relations include the establishment of the new office of recreation director to promote social and athletic activities, and a safety contest.



"WE'VE DECIDED NOT TO BOTHER CANNING IT. WE MAKE ENOUGH OFF THE BY-PRODUCT!"

Grain Milling Wages Average $0.99 Hourly

THE more than 28,000 plant workers employed in the grain milling industry earned an average of 99 cents an hour in straight-time wages in January, according to the Bureau of Labor Statistics. The range of individual rates varied from 45 cents to $2.00 an hour. Only one-tenth earned less than 65 cents an hour. One-sixth earned less than 75 cents, the minimum wage President Truman has asked Congress to fix.

In early June there appeared little prospect that the Congress would pass a new minimum wage law. Neither the House nor Senate committees, which held hearings, had reported any bill.

The present minimum is 40 cents in the states. The minimum in the sugar industry in Puerto Rico has been 35 cents. Wage-hour administrator William R. McComb has announced intention of raising this to 40 cents. It would affect 20,000 employees and create pressure for increasing sugar prices.

Food Companies Make Taft-Hartley Law Work

SALESMEN of Kraft Food Co., Philadelphia, took advantage of the Taft-Hartley law recently, when they voted 14-8, in a national labor relations board election, to decertify the food drivers, salesmen, dairy and ice cream workers, Local 463, of the Teamsters Union, AFL.

Another food labor case involved the George Ehlenberger & Co., New York City. Here the AFL dairy products, fruit and vegetable packers union sought to obtain recognition as bargaining agent for production employees in the butter, cheese, egg and shipping departments.

In directing that an election be held, the National Labor Relations Board upheld the union on one point and the company on another. It agreed with the union that the son of the company vice president, although performing the same duties as others in the shipping room, should be excluded from the bargaining unit because his interests are on the side of management. It agreed with the company that section leaders receiving a guaranteed weekly pay are not supervisors and should be included in the production worker group.

DR. B. S. CLARK

Research Associates Elect First Officers

ASSOCIATES of the Food and Container Institute for the Armed Forces gathered for the first annual meeting, in Dayton, O., May 17 and 18, elected Dr. B. S. Clark, research director, American Can Co., as the group's first president.

Organized during the past year (See F. I. Dec. 1947, Pg 141) to serve as a clearing house for all research projects in the food processing and container manufacturing fields, the group is now composed of 166 companies; and leading trade associations in those fields. The Dayton meeting resulted in the election of a full panel of officers and a board of directors. The board met again at the IFT conference in Philadelphia, early in June, where the projects of the associates were further discussed.

Thomas M. Rector, vice-president, General Foods Corp., was elected vice-president of the organization; Victor Conquest, research director, Armour and Co., is treasurer, and Col. R. A. Isker, secretary. R. C. Newton, vice-president, Swift & Co., was named vice-chairman of the board of directors.

Offer Food Course

A BIOCHEMICAL course, designed to prepare the student for a career in food or drug processing, is included among four new options in the field of chemical engineering to be offered by the University of Mississippi.

The new curriculum, set up by Dr. Lee H. Johnson, dean of the engineering school and Dr. Frank A. Anderson, acting chairman of the department of chemistry and chemical engineering, offers options in technological, administrative military chemical engineering, in addition to the biochemical option.

3 SPECIFIC TYPES

... each for a definite purpose and all interchangeable

LUNKENHEIMER

150 LB. S.P. BRONZE GATE VALVES

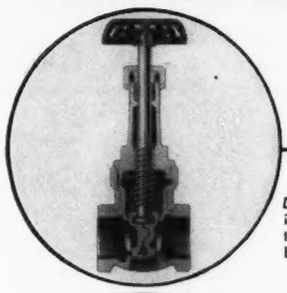


FIG. 2150
Double Wedge Disc—Rising Stem. For use where the flexibility of the double disc is needed.

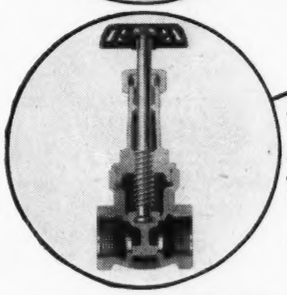


FIG. 2151
Solid Wedge Disc—Rising Stem. For use where the solid disc may be an advantage, as in food processing lines and handling gummy substances.

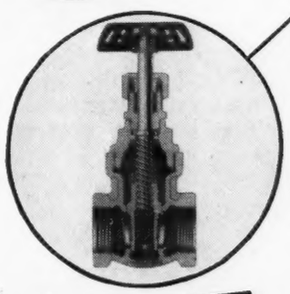
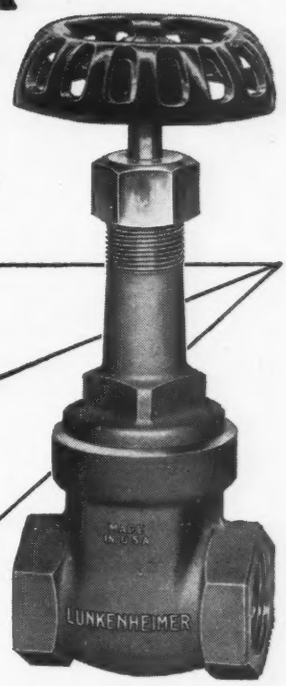


FIG. 2153
Single Wedge Disc—Non-Rising Stem. For installations where headroom is too restricted for rising stem valves.



• These new rugged designs meet all requirements for service where 150 lb. S.P. Bronze Gate Valves are used. They are engineered to provide a wide degree of interchangeability, making it possible to convert from one type to another by a simple interchange of trimmings. This means fewer valves and parts to stock, thus reducing maintenance expenses.

All three of these designs are equipped with Lunkenheimer patented wear-resistant alloy stem material which eliminates failures due to stem-thread wear.

Why not investigate the profit possibilities of these new valves in your plant—now.

PHONE YOUR DISTRIBUTOR FOR FOLDER

Design, construction and interchangeability are fully illustrated and described in Circular No. 574. Ask your distributor for a copy or write us direct.

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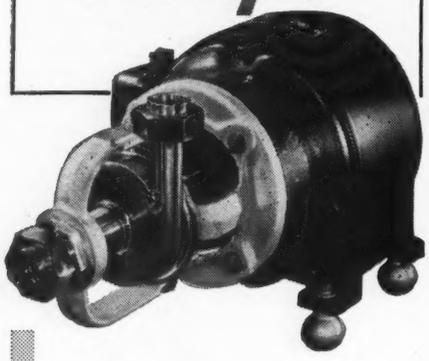

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WELCOME TO LOCKER CONVENTION

Members of the Southeastern Frozen Food Locker Association lost no time greeting the official hostess at their second annual convention and exposition, in Atlanta, Ga. W. Carlos Mills and James P. Vickers are telling her about frozen Georgia peaches.

Instrument Courses Offered by Bristol

A SERIES of courses for plant instrument and operating men in the theory and application of industrial instruments, are being conducted by the Bristol Co., Waterbury, Conn. Each course consists of two weeks of intensive lectures and laboratory work, with special emphasis on instrument maintenance and repair. Subjects covered include instruments for pressure, temperature, relative humidity, flow, pH and electrical measurements; pyrometry; pneumatic, electric and electronic control systems, and telemetering.

These courses are open to men interested in the application, servicing, and repair of instruments in all types of manufacturing plants, and are under the direction of F. A. Faust, Education Department, The Bristol Company, Waterbury 91, Conn.

Two Southern Groups Merge Associations

PROGRESS in maintaining close control and adequate inspection of foods and drugs was reported during the 25th annual convention of the Association of Food and Drug Officials, of the Southeastern States, at Jacksonville, Fla.

Members of the association at the closing session voted to merge their organization with the South-Central group for a Southern Association. Officers of the Southeastern association were re-elected and appointed to serve on the organization committee. The proposed merger is believed to offer greater progress for the food, drug and health officials of the South.

Delegates visited the Shaw Crabmeat Plant in Jacksonville before the lecture session dealing with inspection of oysters, crabmeat and other raw shellfish. V. M. Bryant, sanitarian for the Florida State Board of Health, and William Weston, senior sanitary engineer, South Carolina Board of Health, led the discussion on the analysis and inspection of raw shellfish.

Mr. Bryant pointed out that the Shaw plant had been designed by the State Board of Health with cleanliness and freshness of the product the main consideration.

Dr. L. G. McDowell, research director of the Florida Citrus Commission at Lakeland, said that orange concentrate is just as healthful as the fresh variety. He pointed out that the juice concentrates are preserving essential food values.

Officers re-elected included Dr. V. E. Stewart, director of food and drug laboratory, Florida Department of Agriculture, president; A. D. Harris, Atlanta, Ga., vice-president; and J. J. McManus, chief of the Atlanta, Ga., station, U. S. Food and Drug Administration, secretary. Members of the executive committee include A. C. Summers, of Columbia, S. C.; Dr. H. G. Bailey of Savannah, Ga.,; and Max Turtletaub, of Charleston, S. C.

National Canners Plan Building and Research

PROGRESS along several fronts was reported to the Board of Directors of the National Canners Association, at the meeting of the board, May 27-28, in Washington.

Among the reports by staff members and permanent committees were:

Association Building Plans. A building committee reported consideration of a building in San Francisco which, upon further study, might prove to be the answer to the Association's need for additional laboratory and office space on the West Coast.

Cannery Lighting Research. The directors voted $3500 to continue the research study into lighting problems of canneries begun in 1944 through a research fellowship at Stanford University. An Illuminating Engineering Society committee, set up to adopt recommended practices for lighting of canneries, has completed the first part of findings, "Lighting the General Areas of Canneries." Part II of the I.E.S. bulletin will relate to the use of supplementary lighting for many difficult seeing tasks in canneries. This section of the study has been hard to organize because of the wide diversity of conditions and problems in different canneries processing different crops in different areas.

Freight Damage. The directors authorized the NCA staff to continue working with the Association of American Railroads, can and carton manufacturers, and other groups studying the problem of reducing freight damage and freight damage claims. Up to now, NCA representatives have attended formal meetings only as observers. It was noted that freight damage claims on canned foods for 1946 totaled about $3 million.

Scientific Research. NCA noted that its research laboratory in Washington is being called upon regularly to do more and more work under the Food and Drug Act. To that extent, the laboratory and the funds on which it operates is being used less for straight research on food technology, which was the laboratory's original purpose.

Labeling. The budget for labeling work of NCA, directed at getting canners and distributors to adopt recommended labeling terms, was increased. The reason: to continue direct personal calls, which has been found to be the most effective in obtaining adoption of the labeling program.

Which is Easier to Store?

The Answer is one of 11 reasons Why You Should Use

MM&R SPICE OILS for MODERN FLAVOR CONTROL

Two lbs. of Oil Thyme MM&R is the equivalent of 100 lbs. of dry spice. So of course you conserve storage space, facilitate handling, when you use Spice Essential Oils. In addition, bottled Spice Oils assure against the introduction of foreign bacteria or other contaminating substances.

And that's not all — highly concentrated Spice Essential Oils are more economical . . . provide uniform distribution of wholesome flavor without color disturbance.

These are just a few of the 11 reasons why more and more producers of food products are switching to Spice Essential Oils . . . *the MM&R brand* . . . pacesetter in the field of Spice Oils for the food industry.

1. Uniformity of quality and flavoring
2. No color disturbance
3. Less bulk in storage
4. Less weight in shipping
5. No danger of molding
6. No loss by exposure in package while being stored
7. No starch introduced into your mixture
8. Ease of handling
9. Less cost as compared to equivalent spice value
10. Entire flavor available immediately
11. Elimination of the possibility of dust and dirt

Send for "Table of Equivalents" Showing Comparative Flavoring Strengths of Whole Spices and Spice Oils

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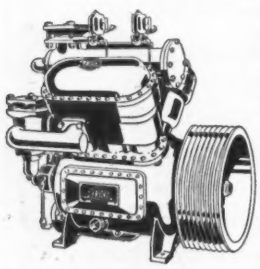
It tells all about the "New Eclipse" compressors . . . how they meet the needs of restaurants, theatres, stores, institutions, offices, factories, ships and others . . . for dependable air conditioning, food storage, or special refrigeration work.

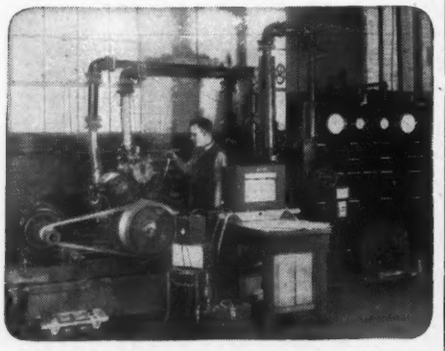
Frick "New Eclipse" compressors have back of them 66 years' experience in building dependable cooling equipment.



6-Cyl. "New Eclipse" Compressor, One of Four Sizes

If you need commercial or industrial refrigerating machines handling Freon-12, ask for your copy of Frick Bulletin 100-D.

Frick Branch Offices and Distributors are in principal cities everywhere.



"New Eclipse" Compressors Do Well in both Laboratory and Field Operating Tests

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

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THE PROCESSING PICTURE

Lab Studies Made for Drying Sweet Potatoes

THE cost of dehydrating sweet potatoes for livestock feed totaled $9.90 per ton in trials conducted by the University of Arkansas, bureau of research, in the pilot plant, at Jonesboro. The total includes depreciation interest on investment, fuel, power, labor, and maintenance. Labor costs, calculated at 60 cents an hour for three employees, came to $5.58 per dry ton.

The cost figures are based on seven trial runs during which 42,000 lb. of raw potatoes were processed. About 3 lb. of raw potatoes were required to produce 1 lb. of dehydrated meal.

The studies were conducted by B. H. Lewis and W. S. Farris and were recently published to include, in addition to cost information, detailed analysis of the effects of different methods of handling dehydrated sweet potatoe meal, as well as market outlets.

USDA Grade Standards

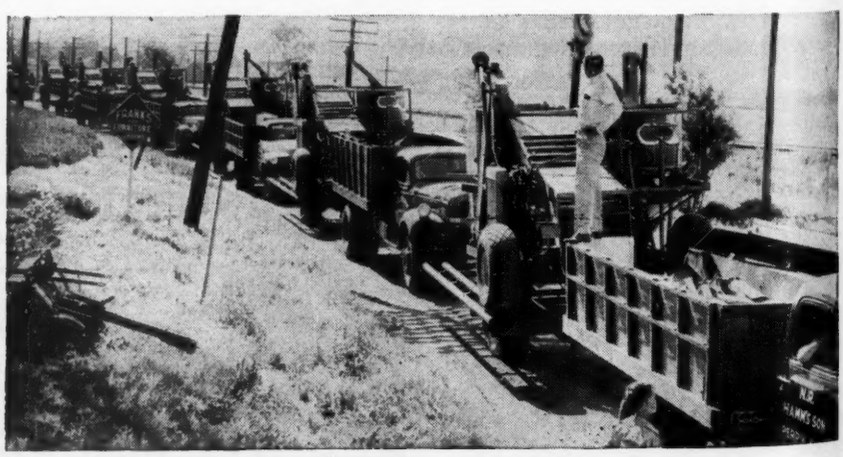
FROZEN raspberry standards are being revised. Notice of the proposed revision was published in the May 29 Federal Register beginning on page 2931. The revision includes grade standards for frozen raspberries for manufacturing, in addition to the previously promulgated standards for frozen raspberries which made no provision for manufacturing grades.

Although character, absence of defects, and color are considered in ascertaining these new grades for manufacturing, the characteristic numerical scoring system is not used. Provision is thus made for the highest grade of frozen raspberries slightly less rigid than the former grades when the only difference might be the fact that the manufacturing grade berries are crushed because of packing in large containers. For berries that are used in preserves, ice cream, sherbert, and other comparable foods, a crushed berry of otherwise highest grade is quite satisfactory.

Sweet potatoes were the subject of a few minor amendments of the U. S. Grade Standards, which have been in effect since July 22, 1946. Size and shape requirements for U. S. Extra No. 1 and U. S. No. 1 were affected. The definitions of "misshapen" tolerance and "cleanness" were also made slightly tighter in the amendments proposed on page 2659 of the May 15 Federal Register. June 4 was set as the date by which written data, views, or arguments, should be submitted for consideration prior to issuance of a final order.

Shell eggs have been covered by tentative U. S. Specifications and weight classes for consumer grades since September 17, 1947. The tentative status has now been dropped. Printing of these grades in the Federal Register to comply with the Administrative Procedure Act occured on April 28, beginning on page 2294. No objections were received.

During the next year, issuance is expected of standards for frozen pineapples and revisions of the



Wide World

READY FOR HARVESTS

Bound from Kansas to Texas, this harvesting outfit includes ten 14-ft. combines, four trailer houses and a maintenance truck with electric light plant among its facilities. The crew of 27 persons will work north from Texas into the Dakotas.

standards for cucumber pickles, canned black-eyed peas, beets, spinach, and canned and frozen asparagus. The Department plans to concentrate on improving the standards now in effect rather than on standards for additional products. Through research, USDA expects to develop additional objective methods for measuring quality factors and to develop and employ additional visual aids to the uniformity of size and shape. Studies also in progress look to the forming of a basis on which recommendations can be made for guides in the U. S. standards for drained weights of frozen vegetables, and the proper fill of containers for frozen fruits.

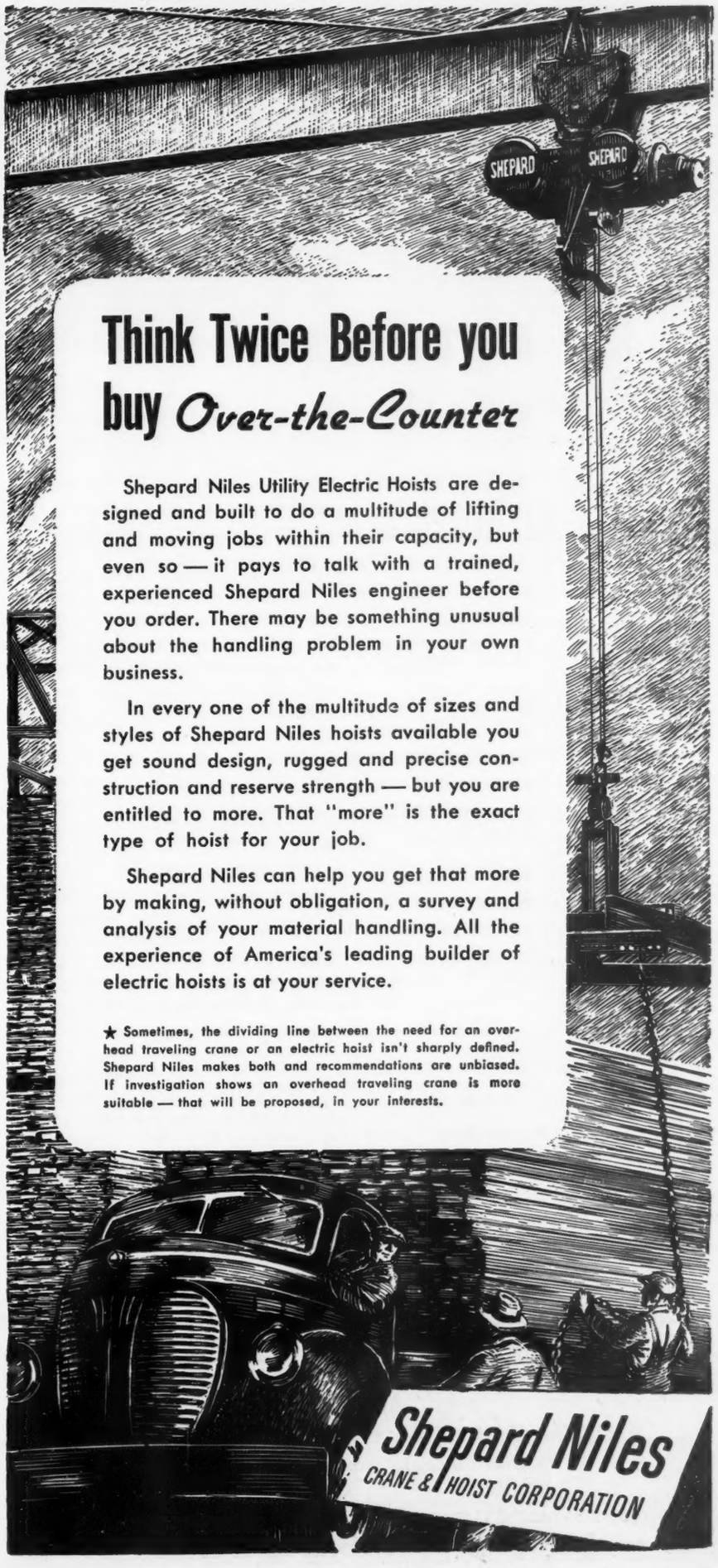
Candy Ingredients Discussed at Lehigh

PROPER use of principle ingredients in the making of better quality candies was outlined at the second annual production conference of the Pennsylvania Manufacturing Confectioners' Association in cooperation with the Lehigh University Institute of Research, May 20 and 21, at Bethlehem, Pa.

How to improve the quality in candies by the use of the ion exchange technic was told by J. Thompson, the Resinous Products & Chemical Co., Philadelphia. He reported that alkalinity and the presence of iron, calcium and magnesium in water interfere with the inversion of sucrose and adversely affect color in the preparation of hard candies. By removing these ions with a two-bed ion exchange system, normal inversion of sucrose takes place and the candies are clear, light in color and free from graininess.

James King, vice-president, Nulmoline Co., New York, discussed the use of invertase in candies. He said that unless invertase is added to candies, sucrose crystals are converted into invert sugar sirup, thus increasing the sirup density to the saturation point and checking fermentation. Invertase also acts to make the candy softer and to retard drying.

L. R. Cook, vice-president, W. A. Cleary Corp., New Brunswick, N. J. pointed to the commercial usefulness of lecithin in chocolate and confectionery products. In chocolate products lecithin serves two purposes: (1) Economic and (2) quality improvement. Economically, it reduces the viscosity of the chocolate coating, hence minimizing the quantity of cocoa butter required. Quality is enhanced, especially with the intro-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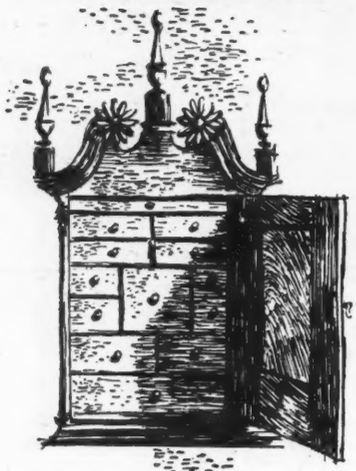

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Highly concentrated water miscible flavors ready for use "as is." These high quality Florasynth Spicearomes eliminate the trouble and expense of manufacturing flavor emulsions. They disperse evenly and completely and are efficient and economical because ALL OF THE FLAVOR IN THE SPICEAROME IS IMMEDIATELY AVAILABLE IN THE FOOD PRODUCT BEING FLAVORED.

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DILL PICKLE 'K'	CLOVE
SWEET PICKLE	CUMIN
SPICEAROME 'M'	GARLIC
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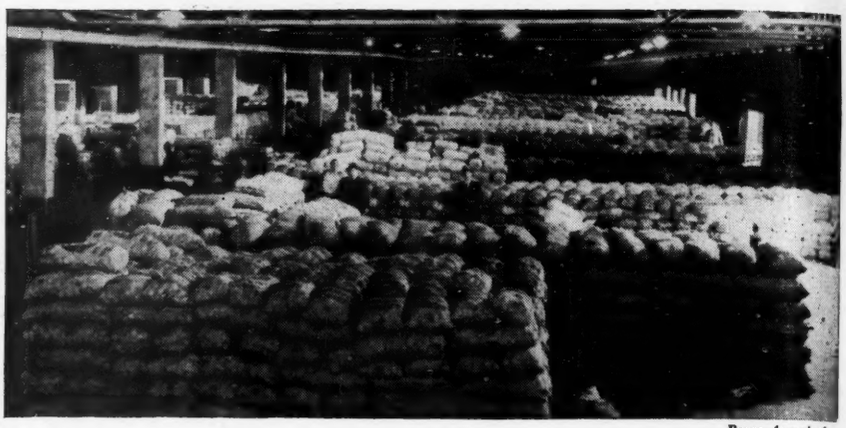

Press Association

PREPARED FOR RAIL STRIKE

Pennsylvania railroad's produce terminal, in Philadelphia, was stocked with a four months supply, early in May, just in case the railroad strike became a reality.

duction of high-speed machines calling for more cocoa butter than formerly used and the addition of lecithin to obtain the low viscosity necessary to operate these machines.

H. C. Burr, the Best Foods, Inc., warned against giving insufficient thought to the production of a compound coating. He said that these coatings are similar to a chocolate coating and they should be made the same way.

Harold Butler, Central Soya Co., Inc., lamented the fact that anxiety to bring the new product, soy albumen, into use in making candy, resulted in difficulties because it was not recognized that effective use of the new albumen product demanded changes in established technics. He said that manufacturers of soy albumen have been at fault. They did not know the product, or how to use it. In fact, they tried to force it to behave like egg albumen. That was their false start.

This they learned about soy and egg albumens: They are predominantly protein in nature and classified as albumen. But they differ widely in many important characteristics. The seven basic properties of soy albumen that were found to be advantageous to candy manufacturers in the production of aerated type candies are:

1. It is chemically processed under sanitary conditions, tailor-made to give uniform performance.

2. It is a high quality protein food with a high percentage of essential amino acids.

3. Bacterial standards for soy albumen are higher than government specifications for dairy products.

4. It produces small, uniform air cells of exceptional stability when used as an aerating agent in candy.

5. It is not adversely affected by high temperatures encountered in the production of candy.

6. The unusual properties of soy albumen make possible the streamlining of production procedures and reduce material cost at the same time.

7. It improves the quality of aerated candies and reduces costs.

C. Gallagher, California Fruit Growers Exchange, pointed out that the manufacture of citrus pectin candies and jellies are unlike. To make pectin candies, a readjustment of the chief ingredients must be made. The firmness of the candies is increased by adding more pectin and cooking the batch to a higher temperature and solids content. It is also necessary to substitute part of the sucrose with corn sirup to prevent crystallization of sucrose. Sufficient acid must also be added to produce the desired flavor, and buffer or alkaline salts must be used to retard the setting time.

F&DA Standards

CANNED oysters final order, effective June 11, may be reviewed by the 9th Circuit Court if Willapoint Oysters, Inc. petition is granted. Court argument was set for June 7.

Canned green and wax beans amendments to standards of identity and quality tentative order was issued May 13. Nearly all of the amendments requested by National Canners Association were granted in the tentative order.

Bromated flour tentative order was printed in the June 10, Federal Register, page 3135. It recommended potassium bromate addition in bromated flour and enriched bromated flour, "in a quantity not exceeding fifty parts to each million parts of the finished . . . flour, and is added only to flours whose baking qualities are improved by such addition." This represents essentially what was requested by Millers National Federa-

tion in its petition, answered by the hearing of March 24. Exceptions to the tentative order could be filed until June 30.

Salad dressings tentative order was not expected for some weeks because of the length of the hearings and the late date (May 17) by which briefs were still accepted. Frozen fruits standards of identity and fill of container were still being discussed as this issue went to press in early June.

Ascorbic Acid High In Asparagus Tips

THE green portion of asparagus, particularly the tip of each stalk, contains a great deal of ascorbic acid, in the opinion of researchers at the horticulture laboratories, the University of Maryland. Some parts of this plant are said to produce juice containing twice as much ascorbic acid as any of the normal sources like citrus and tomato juice.

Unfortunately the quantity of ascorbic acid decreases rapidly down the length of the stalk. It is high in the tip, but reaches a very low figure in the bleached part at the butt of the stalk as normally marketed. Thus it seems unlikely that recovery of this interesting nutrient from asparagus-cannery waste would be feasible. The portion canned carries practically all the valuable concentration.

A sidelight on the asparagus work at Maryland is the study of breaking strength as related to toughness. It has been established that the normal stalk breaks at a point of about uniform toughness, regardless of the diameter of the individual piece. Thus a crude empirical evaluation can be made of both strength and tenderness by a simple breaking test. As yet the tests of these properties have not been made quantitative, nor has the test as yet been advanced to the point of usefulness in factory control. Work on this latter phase of the subject is continuing in parallel with the chemical studies.

Florida Citrus Changes Approved by Commission

RECOMMENDATIONS for sweeping changes in the grading standards for Florida citrus fruits have been approved by the Florida Citrus Commission, ending a debate that has been going on for several years. The changes, designed primarily to curb the practice of shipping early season unripe oranges and grapefruit to northern markets, had been urged by

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2 second closing

Extra load cycles every day with the Harris Quick-Opening *Safety* Door.

You save time on every load cycle when your retorts have Harris Quick-Opening Safety Doors. No more slo delaying, loosening of bolts; no wrenches or special tools. Actual timed opening requires only 4 seconds— on any size pressure or vacuum vessel.

Basic principle is a bearing mounted, rotating lugged ring which interlocks a series of wedges. Other featur are a full-molded self-sealing gasket; precision machined non-sagging door hinge. Opening requires b two quick motions; one to release any possible remaining pressure or liquid, the other to open the door.

Harris doors fit any horizontal or vertical retort, operate equally well under vacuum or pressure; code tested. Find out how you can save retort time—increase your number of load cycles every day. Write for complete details.

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- **Inherently Self-Governing**
- **Quiet and Vibrationless**
- **Only One Moving Part . . .**

Power consumption varies with the load and a constant pressure is maintained through the entire capacity range.

Only two bearings—located well outside of the housing—require lubrication.

External bearings assure clean dry air at all times.

Ample clearances permit normal quantities of dust to pass through the machine without harmful effect.

The impeller assembly—the only moving part—is accurately balanced.

Allen-Billmyre Blowers and Exhausters are highly efficient for Agitation and Aeration . . . Manufacture of Gases, Acids . . . Combustion Processes . . . Conveying . . . Cooling and Ventilation . . . and all low Pressure and Vacuum Requirements

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Send for Bulletin B-5. Describes Blowers and Exhausters . . . their application and specifications.

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LAMSON CORPORATION

551 Lamson St. Syracuse, N. Y.

a special grading committee comprised of growers and shippers, after weeks of public hearings and investigations of marketing practices.

Chief of the points contained in the new standards is the raising of the internal (juice) quality requirements of oranges, making it mandatory that all oranges shipped out of the state be of at least Grade A juice content. This is the point aimed to hold back the early season unripe fruit which, the commission said, "has put Florida citrus in bad repute." The Grade A standard has been regarded as purely a permissive one which shippers could stamp on their boxes if they so desired.

Regarded also as highly important is the complete elimination of the combination grade on oranges, grapefruit and tangerines. This has been the practice of shipping a combination of No. 1 and No. 2 fruit in the same box, which might run 50-50, or as high as 90 percent of No. 1. The combination grade was used mainly by shippers in the interior growing areas. Elimination of the combination grade was accomplished by setting up No. 1 and No. 2 grades.

Grade A requirements as now set up say a lot of ten oranges must have a minimum of 9 percent soluble solids in an average test. This was a slight compromise from the committee's recommendation for tests of ten individual oranges. Also, the Grade A requirement calls for a minimum of four and a half gallons of juice in a one and three-fifths bushel box of oranges. The present standard calls for 4 gal. from large fruit and 4½ gal. from the smaller sizes.

DEVELOPMENTS IN DISTRIBUTION

Milk Producers Urged To Tell Pricing Facts

CONSUMERS should be better informed on milk prices, according to two prominent authorities. Prof. K. M. Autrey, head of the Department of Dairy Husbandry at the University of Alabama, declares that the public should be told that the increase in cost of all foods from 1939 to 1947 was over 100 percent, while the increase in fluid milk costs was just over 60 percent.

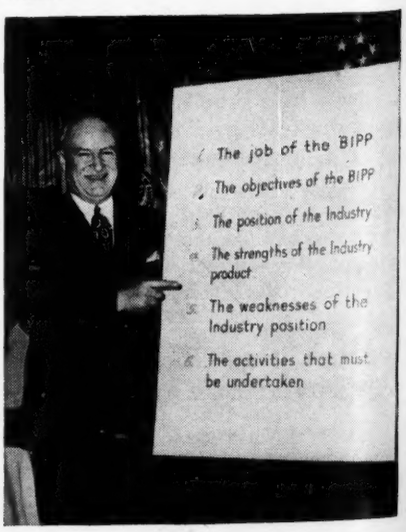
"Another important consideration," says Professor Autrey, "is the margin of profit on which our milk industry operates. One national survey indicates that most Americans consider 10 to 15 percent on sales as a fair profit. Yet, six of our nation's principal milk distributing companies made only 1 percent net profit on sales during the six-year period, ending in 1946.

Similarly, Ira Mosher, Public Relations Counsellor and former president of the National Association of Manufacturers, urges the ice cream industry to tell its price story to the public and "let the consumer decide who is responsible for high prices."

Pointing out that in the metropolitan New York area, wholesale ice cream prices had risen only 21 or 22 percent since 1942, Mr. Mosher told the 41st annual meeting of the Association of Ice Cream Manufacturers of Pennsylvania, New Jersey and Delaware that it would be a public service for the industry to put the responsibility for high prices where it rightfully belongs.

"There is clearly no sense for manufacturing industry to sit placidly by and be the patsy in this price situation," he said. "And the ice cream industry has a better story to tell than most industries. Despite the comparatively small increase in the wholesale price, the retail price has soared too high in many instances, but it is the manufacturer who gets the blame.

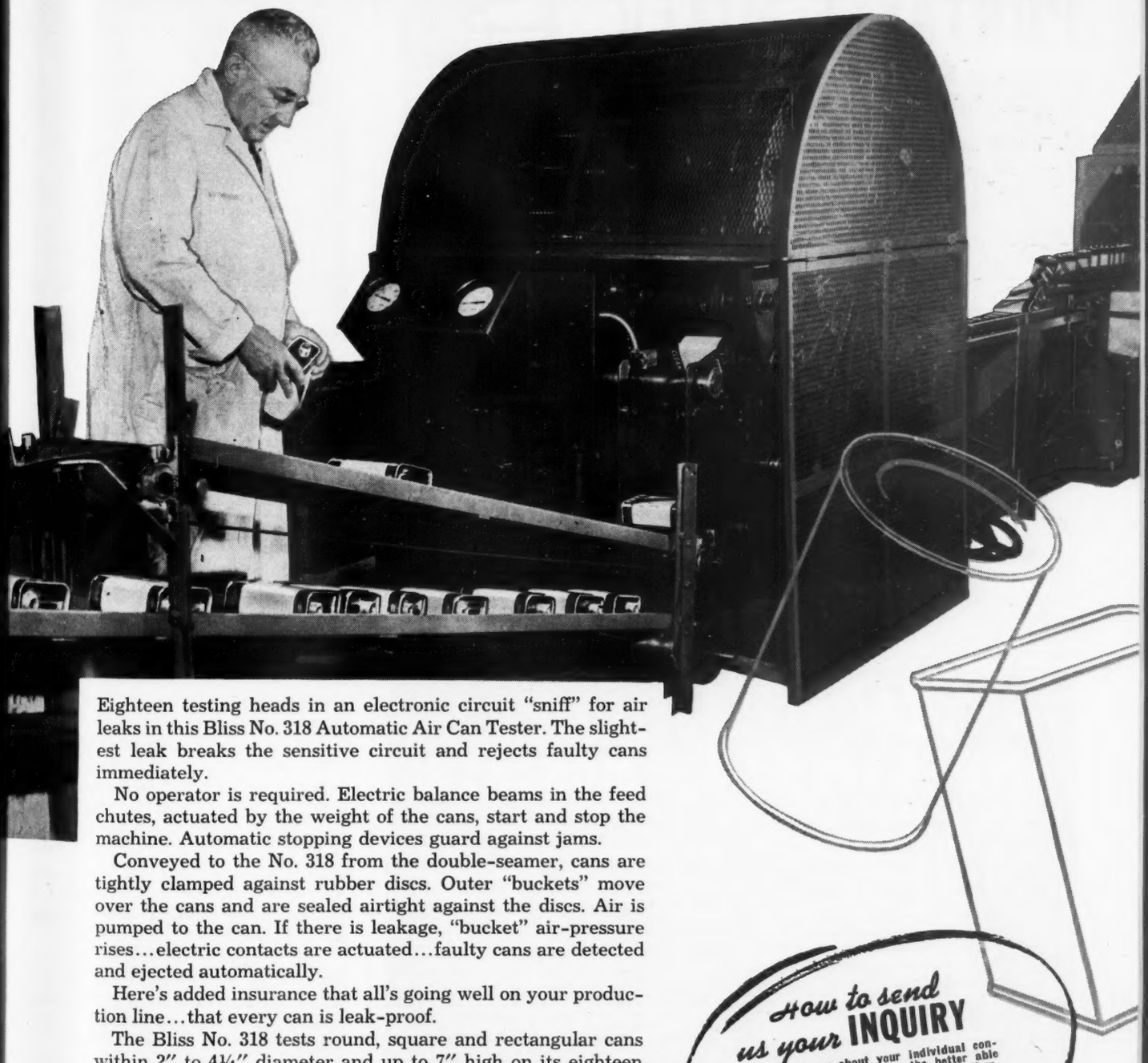
"Now the ice cream manufacturers can not control the retail prices of their products, but there is no reason why they should accept the responsibility for unreasonable increases for which they are not to blame."


The job of the BIPP
The objectives of the BIPP
The position of the Industry
The strengths of the Industry product
The weaknesses of the Industry position
The activities that must be undertaken

BAKERY PROMOTION

Chairman Harry W. Zinsmaster, American Bakers Association, displays the Baking Industry Promotion Program, which is expected to undergo further expansion at the annual convention, in November.

New Bliss Automatic Can Tester detects air leaks electronically



Eighteen testing heads in an electronic circuit "sniff" for air leaks in this Bliss No. 318 Automatic Air Can Tester. The slightest leak breaks the sensitive circuit and rejects faulty cans immediately.

No operator is required. Electric balance beams in the feed chutes, actuated by the weight of the cans, start and stop the machine. Automatic stopping devices guard against jams.

Conveyed to the No. 318 from the double-seamer, cans are tightly clamped against rubber discs. Outer "buckets" move over the cans and are sealed airtight against the discs. Air is pumped to the can. If there is leakage, "bucket" air-pressure rises...electric contacts are actuated...faulty cans are detected and ejected automatically.

Here's added insurance that all's going well on your production line...that every can is leak-proof.

The Bliss No. 318 tests round, square and rectangular cans within 2″ to 4¼″ diameter and up to 7″ high on its eighteen testing stations. Compact? Floor space required is only 76″ x 60″, F to B x L to R. It is fully enclosed.

Let a Bliss engineer show you the advantages of fitting the No. 318 Can Tester into your can making set-up. His recommendations will reflect the experience of the world's largest independent manufacturers of can and container machinery.

How to send us your INQUIRY

The more we know about your individual container machinery requirements, the better able we will be to help you meet them. The following information is requested:

Dimensioned drawings; hourly production required; intended contents of container; floor space; power characteristics; gas supply available w.i.e.e soldered cans involved.

E. W. BLISS COMPANY

Container Machinery Division
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Bliss produces machinery for making: Sanitary round cans . . . 1-5M per day; 5-gallon square . . . 1-1½M per 8 hour day, 5-8M per day, 15-20M per day; Screw and crown caps; Square and oval cans (fish); Dry package containers; Flit cans; Paint cans; Milk cans; Butter cans; 5-gallon Kit line; Pails and Buckets; Special and irregular shapes; Drums and Barrels; Individual sheet metal working machines.

New! **TERRISS 3-SPEED**

PORTABLE MIXER

STIRS • BLENDS
MIXES • AGITATES

No more carrying heavy mixer . . . clamping to tanks . . . breaking side walls.

The New TERRISS 3-Speed Portable Mixer is an all-around unit that will take care of all your mixing, blending and agitating problems. If your tank or vat is below floor level the TERRISS 3-Speed Mixer will reach down and do a real job for you. If your container sits on the floor, a little adjustment and the mixing begins. If your tank or container is high off the floor, the TERRISS Mixer will lift up and do the mixing job.

All parts that touch your product are Stainless Steel. Standard belt drive permits propeller speeds of 175 RPM, 325 RPM and 575 RPM. Other combinations are available with simple adjustments. Both propeller shaft and stand are adjustable, permitting unlimited settings to fit any job in your plant.

Send your order today . . . money-back guarantee.

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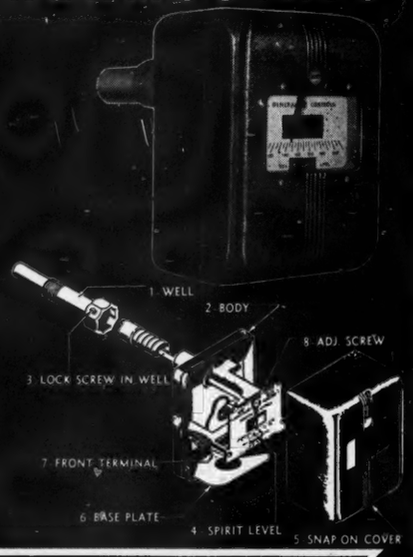
New **L-578 SERIES**
IMMERSION THERMOSTATS

8 FEATURES

1. **ACCURATE AND POSITIVE IN ACTION.** The result of design-simplicity.
2. **VISUAL LEVELING INDICATOR.**
3. **COMPLETE SELECTION OF TEMPERATURE RANGES AND SWITCH COMBINATIONS.** Models to meet every requirement.
4. **FAST REACTION TO LIQUID TEMPERATURE CHANGE.** Two-inch well provides large heat-exchange area for direct and proximity contact with temperature-sensitive element.
5. **CLOSE TEMPERATURE DIFFERENTIAL.** Approximately 10° F. in most installation conditions.
6. **TEMPERATURE SETTING EASILY CHANGED.** Just one external adjustment screw to turn.
7. **AMPLE CURRENT CAPACITY FOR USE IN ALL STANDING CONTROL SYSTEMS.** Up to 15 Amp. switch rating.
8. **MERCURY TYPE SWITCH.** Dust-proof, tamper-proof, impervious to corrosive atmospheric conditions and "pitting" characteristics.



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FOR COMPLETE SPECIFICATIONS REQUEST BULLETIN SDL-32R-2. 25 3

SOMETHING FOR A NICKEL

Claimed as the nation's first fully automatic coffee vending machine, Rudd-Melikian, Inc., have turned out nearly 1,000 Kwik Kafe dispensers since last October. It delivers 500 cups, without refilling, along with cream and sugar, if desired.

Uniform Beet Prices Violate Sherman Act

THE Supreme Court last month (May) drew an important legal distinction between the sugar refining industry and other food processors.

In a case brought by two California beet farmers (Mandeville Island Farms, Inc., and Roscoe C. Zuckerman) against the American Crystal Sugar Co., the Supreme Court held that California sugar refiners, who sell in interstate commerce and who agree among themselves to pay a uniform price for sugar beets grown in California, are in violation of the Sherman Anti-Trust Act. (The price was pegged to the market price for refined sugar by an agreed upon formula.)

The majority opinion (7—2) in the case written by Justice Rutledge, drew the line between sugar refining and other food processing as follows:

"To compare an industry (sugar) so completely interlocked in all its stages by all-inclusive contract as well as by industrial structure and organization, with one like the producing, processing, and marketing of fruits, vegetables, corn, or other products, susceptible of various uses and under conditions affording varied outlets for market, both local and interstate, in the raw or refined state, in which neither such a contractual nor such an industrial integration exists, is to ignore the facts of industrial life."

The court found that California sugar refiners, including the defend-

ant company, allocated among themselves the market for California beets substantially upon the basis of quotas competitively established among them at the time the uniform price arrangement was agreed upon. This, said the Court, helped control the quantity of sugar released to the interstate market.

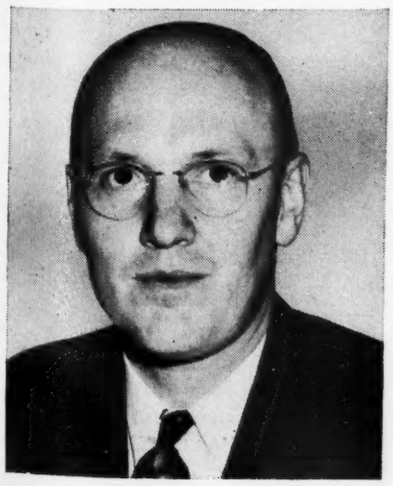
In a dissenting opinion, in which Justice Frankfurter joined, Justice Jackson declared that the effects ran in the other direction. The market price for sugar, he said, was the base on which the price of beets was figured. The dissenters favored upholding the lower court decision.

On the basis of the majority decision, however, the case now goes back to the Federal District Court for Southern California, which first dismissed it. That court will now try the case in line with the Supreme Court's order. The farmers asked for triple damages, as provided by the Sherman Act.

USDA Joins Truckers Against ICC Ruling

THE Department of Agriculture and a score of fruit and vegetable associations from Florida to California have joined forces to get the Interstate Commerce Commission to about-face on a decision ICC made last fall.

They are asking a rehearing on an ICC decision (in the Harwood case) which, says Agriculture, puts under ICC rules and regulations all truckers who haul fruits and vegetables that have been washed, cleaned, and packaged in bags or boxes before being transported. Heretofore, all such commodities have been considered as exempt from ICC rules



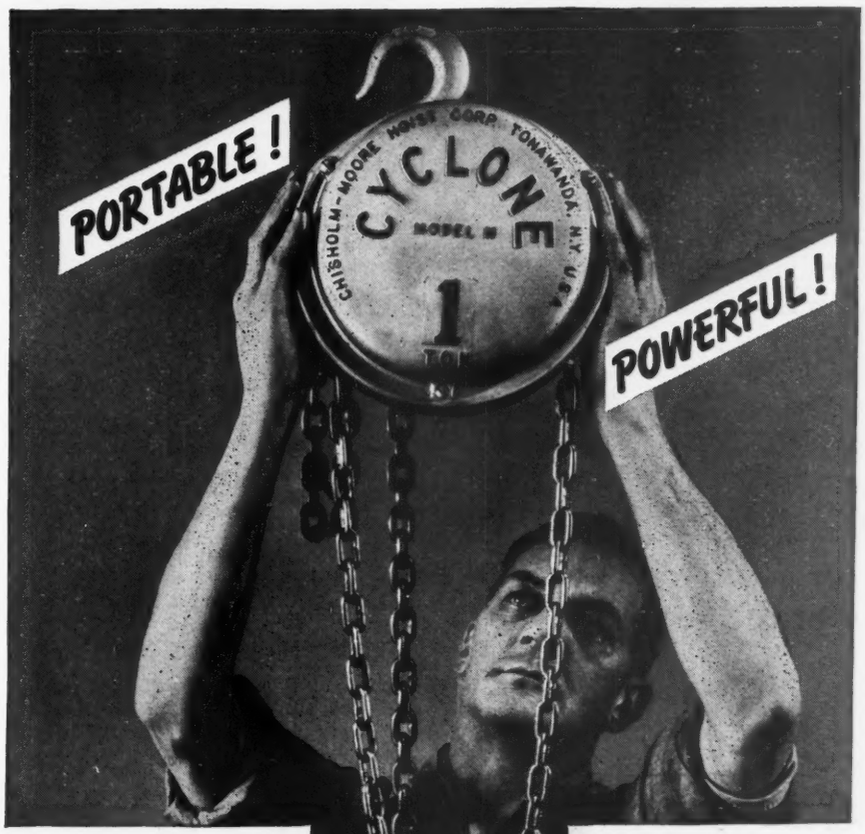
Press Association

NEW SECRETARY

Charles F. Brannan, of Denver, Colo., moves up from assistant secretary to Secretary of Agriculture, succeeding Clinton P. Anderson, who hopes to move to the Senate.

NEW! CM CYCLONE

Model M • HEAVY DUTY HIGH SPEED HOIST • Capacities from ¼ ton up



96% EFFICIENCY
conserves worker energy and increases productivity

42% FEWER PARTS
simplifies maintenance

63% LESS WEIGHT
1 ton weighs 35 lbs.
2 ton weighs 59 lbs.
3 ton weighs 90 lbs.

Plus SEALED-IN LIFETIME LUBRICATION
prolongs life...reduces wear

Plus HERC-ALLOY
America's First and Safest Steel Load Chain

The CM Cyclone Model M, constructed of today's stronger alloys of steel and Alcoa Aluminum, is years ahead as a production and maintenance tool. New type load brake with smooth, positive control aids in spotting and assembly work. Thousands of these extra value hoists are already in service, daily demonstrating their superior performance.

Ask your distributor to show you the new Cyclone Model M Hoist

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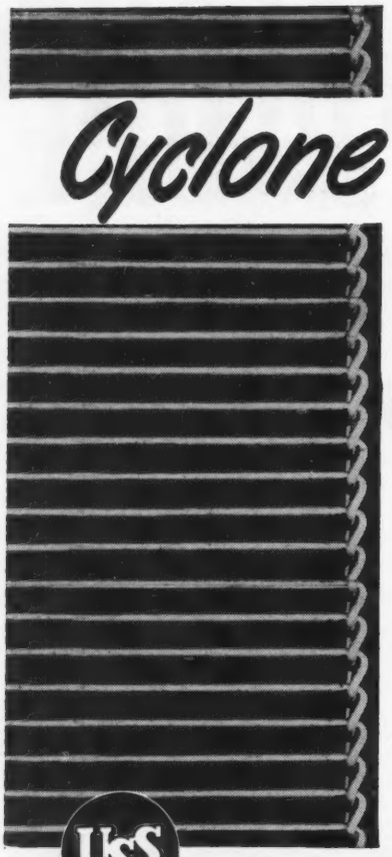

Metal Conveyor Belts... specially designed for you

Cyclone Flex-Grid Belt is made in U·S·S Stainless or Galvanized Steel. Single Pitch for straight runs. Multi-pitch for turn-table operations. Cyclone Belts are also available in Chain Link and Flat Wire styles.

Cyclone engineers will gladly help you select the belt best suited to your operating needs.

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ZENITH
CONTINUOUS PULP PRESS
Now Available With J & C's Newest Development....The Floating Cone!
J & C Power-Control Unit may be located at any point convenient to the operator.

JACKSON & CHURCH COMPANY'S ZENITH CONTINUOUS PULP PRESS offers GREATER efficiency and GREATER profits . . . with the hydraulically-operated cake discharge port or "floating cone."

Long the finest dewaterer on the market, Zenith's new 100% automatic operation assures **CONSTANT, UNIFORM** discharge pressures at any pre-determined degree. Finger-tip adjustment assures drier cake of uniform consistency.

These J & C engineering triumphs . . . **found only in Zenith Press** . . . are available to paper pulp manufacturers, canneries, corn starch plants, fish reduction plants, meat packers, glue plants, and citrus waste drying plants.

For engineering or additional data write Jackson & Church Company at Saginaw, Michigan.

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WORK WELL DONE SINCE '81

Wide World

HEN COMPETITION?

Well, no! It isn't an egg plant, but the "Bulbs" are real egg shells. The natives near Dorado, Puerto Rico, put them on a tropical plant to frighten lizards.

by a section of the Interstate Commerce Act, which specifically exempts trucks hauling agricultural commodities.

However, this same section says that manufactured products of agricultural commodities are not exempt —and this is the part that ICC applied last fall when it gave a trucker a permit to haul washed and packaged spinach, kale, etc. ICC decided these agricultural commodities had become 'manufactured" and hence subject to ICC's rules, rates, and route regulations just like any other truckers.

The decision was a blow to the fast-growing trend of marketing fresh vegetables—such as tomatoes, potatoes, spinach, salad vegetables in consumer-sized bags or boxes. Department of Agriculture and trade associations have been helping the trend along with research projects set up to spread pre-packaging of truck crops.

FTC Complains Against Ten Candy Companies

THE Federal Trade Commission last month (May) continued its hard-hitting campaign against the candy and confectionery industry with a complaint against ten of the industry's leading manufacturers. FTC charged violation of the Robinson-Patman Act against the following companies:

Wayne Candies, Inc., Fort Wayne, Ind.; Melster Candies, Inc., Cambridge, Wis.; Luden's Inc., Reading, Pa.; D. L. Clark Co., Pittsburgh; The Williamson Candy Co., Chicago, a wholly-owned subsidiary

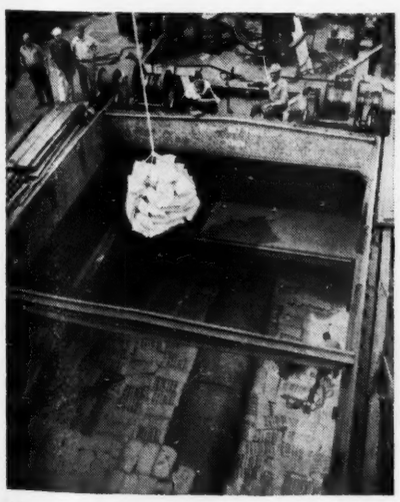
of General Candy Corp., also of Chicago; Bunte Bros., Inc., Chicago; The Sperry Candy Co., Milwaukee; The Queen Anne Candy Co., Hammond, Ind.; The Switzer's Licorice Co., St. Louis; and William Wrigley Jr. Co., Chicago.

Each complaint contains four counts, alleging discrimination in price, services and facilities, as well as unlawful payment or allowance of brokerage fees. In most of the complaints, the discriminations are alleged to have been made primarily in favor of concerns that sell through vending machines. But discriminations in favor of other purchasers, including chain and syndicate stores, are also charged.

The new complaints are similar also to the cease and desist order handed down last November against Curtiss Candy Co. That order, which was not appealed by the company, directed the company to cease inducing price discrimination from its raw material suppliers and also giving price discrimination or favorable "deals" to large customers, which it did not offer on a proportional basis to competing customers.

This latest mass attack on the pricing policies of the candy manufacturers is also linked by trade officials with FTC's successful fight against two producers of glucose. In these two cases (A. E. Staley Mfg. Co., Corn Products Refining Co.) FTC won Supreme Court approval for its contention that the basing point pricing system used by the two companies resulted in illegal price discrimination between competing candy manufacturers.

Among the allowances or pay-



Press Association

ERP GETS UNDER WAY

The first shipment of flour for Greece, under the European Recovery Plan, is loaded into a ship's hold, at Baltimore. Few shipments of even such processed foods as flour are contemplated at present.

As DEADLY as a FIRING SQUAD!

The New
WEST ATOMIZER
for Insect Control!

The revolutionary new West Atomizer, used with West Vaposector Fluid*, is no "hit-or-miss" method. It's *sure—quick—guaranteed* to kill crawling and flying insects in large plants where perishables are processed or beverages bottled.

The West Atomizer dispenses an "Atomized Fog" which penetrates into such "hidden breeding places" as your plant's smallest cracks and crevices. It destroys insect life from egg to adult. The West Atomizer is automatic and easy to operate—a permanent installation which pays for itself in time, money, and product saved.

A prompt, dramatic demonstration by one of West's trained specialists will quickly convince you! MAKE US PROVE WHAT WE SAY! WRITE US ON YOUR BUSINESS LETTERHEAD NOW!

**West Vaposector Fluid is obtainable in non-inflammable, odorless and regular forms. Non-toxic as well as non-staining, West Vaposector Fluid is unsurpassed in insect killing efficiency and economy.*

PRODUCTS THAT PROMOTE SANITATION

WEST DISINFECTING Company
42-16 West Street
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A New Improved UNIVERSAL COLLOID AGENT

IT SUSPENDS . . .
IT GELS . . .
IT EMULSIFIES . . .
IT STABILIZES . . .
IT THICKENS . . .

We are now producing from Carragheen two new improved types of gelose. One of them should be the answer to your emulsifying, suspending, thickening or stabilizing problems.

KRIM-KO GEL is an all-purpose colloid-assistant. Properly used, it has been proved effective in many of the most exacting food, pharmaceutical and industrial applications.

CARRAGAR is an agar-type gelatin which forms tender, fruit-like gels over a wide pH range. It does not require acidulation to produce desired results.

Send for free liberal working samples for experimental use.

YOU CAN SAVE TIME AND MONEY WITH
THOMSEN
DIRECT DRIVE
SANITARY PUMPS
4 IMPORTANT FEATURES:
• smooth, steady flow
• new, simplified head
• no coupling; no bracket
• easier to keep clean
Designed especially to meet the needs of dairies, beverage plants, food processors, creameries, ice cream plants, etc.
THOMSEN SANITARY FITTINGS
Valves, Line Filters, Tubing, Etc.
Your assurance of quality and sanitary design is backed by our 45 years of experience.
Free catalog, specifications, price lists, special equipment quotations on request. Ask your jobber or write L. C. THOMSEN & SONS, INC., DEPT. D., KENOSHA, WISCONSIN.
BE WISE BUY WISE
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KENOSHA, WISCONSIN
SANITARY EQUIPMENT FOR THE PROCESSING INDUSTRIES

ments for "services and facilities," which were not available to all competing customers on proportionally equal terms, the complaints list the payment of discounts "alleged to be equal" to the amounts saved by eliminating:

The 24-count package and the substitution of the 100-count or larger package; printing and advertising on packages; the regular salesman's commission or other merchandising or administrative costs by substitution of orders sent direct to the home office; returns for damaged, stale or unsalable products; and free deals, premium offers or other promotional aids.

Another charge is that each respondent paid brokerage fees or compensation in lieu thereof to direct buyers, in violation of Section 2 (c) of the Robinson-Patman Act.

One complaint against Wrigley is that certain favored customers were allowed a discount in an amount alleged to be equal to that saved in eliminating the wrapping or counterband covering five one-cent sticks of gum, while other customers were denied the privilege of qualifying for this discount.

Wheat Research Brings Increases in Yield

GREATER yield from 10 varieties of wheat, which were improved by research and introduced in the last 15 years, has brought an estimated $25,000,000 increase in wealth to the country, according to Dr. H. H. Laude, professor of agronomy, Kansas State College, Manhattan, Kan.

Wide World

PEACELOVING BEES

W. Leroy Bell has developed a "Caucasian" strain of bees to distinguish them from the belligerent Italian variety. The baby queens emerge from the cocoons along the top of the frame. Workers on the lower part feed them. Maybe because life is made so simple the urge to sting is gone out of them. In any case, they don't.

Research for the increased yield cost only $200,000 per year — approximately one twentieth of one percent of the farm value of the annual wheat crop. Planted on 12,000,000 acres, the varieties added 25,000,000 bu. to the annual yield. At $1.00 per bu. as an average price, the total of $25,000,000 was determined as being a conservative figure.

Meat Inspection

A NUMBER of amendments to the meat inspection regulations were proposed by Bureau of Animal Industry on page 2264 of the April 27 Federal Register. The purpose was to bring the regulations into line with present operating practices by the federal inspectors.

Typical of the proposed amendments was the removal of benzoate of soda and benzoic acid from the list of permitted preservatives for use in margarine, and the addition of monoglycerides, diglycerides, propyl gallate, and citric acid to the lists of substances permitted to be used in the preparation of edible rendered fats. No industry objections had been filed by May 12.

SCHEDULE OF EVENTS

July

12-14—Grocery Manufacturers of America, mid-year meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

12-18—Food and Agricultural Industries, VIIth annual international congress, Paris, France.

August

9-12—International Apple Association, 54th annual convention, Hotel Pennsylvania, New York City.

10-13—Western Packaging Exposition and Conference on Packaging, Packing and Shipping, San Francisco Civic Auditorium, San Francisco, Cal.

9-20—Gordon Research conferences, Colby Junior College, New London, N. H.

9-13—Vitamins and Nutrition.

16-20—Food and Nutrition.

September

8-19—3d International Food Show, Parma, Italy.

11-19—Minneapolis Retail Grocers Association, national food show, Auditorium, Minneapolis, Minn.

13-15—American Soybean Association, 28th annual convention, Hotel Peabody, Memphis, Tenn.

13-17—Instrument Society of America, national conference and exhibit, Convention Hall, Philadelphia.

19-21—Southern Bakers Association, exposition and production conference, Municipal Auditorium, Atlanta, Ga.

20-22—American Meat Institute, annual convention, Waldorf Astoria, New York City.

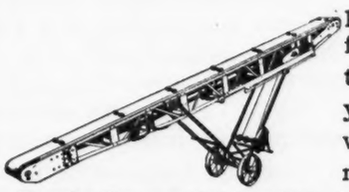
27-Oct. 1—Newspaper Food Editors' Conference, Waldorf Astoria, New York City.

Get better use of your manpower... faster, more effective handling with

Farquhar

FREIGHT CONVEYORS

Farquhar Conveyor Model 435-FM with hydraulic lift for fast and accurate freight handling.



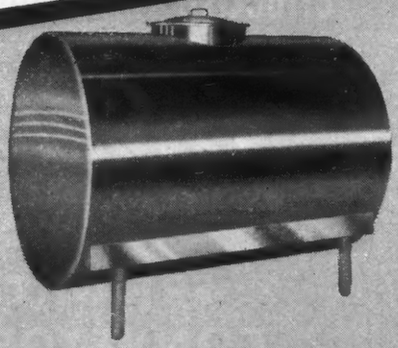
Farquhar Conveyor Model 431-EW for heavy-duty handling of bags, boxes, cartons.

FARQUHAR FREIGHT CONVEYORS are designed with one purpose in mind—*to cut handling costs,* no matter what the handling problem may be. Farquhar conveyors are flexible, can be set up quickly, singly or in tandem, to move packaged materials fast, economically, continuously . . . because they're built to "take it." For horizontal conveying, for loading, unloading, stacking, piling or moving bags, bales, boxes, cartons from floor to floor . . . see Farquhar first for the right materials handling conveyor for your job. Tell us your handling problem; we'll see that you get the information you need. Write A. B. Farquhar Company, 205 Duke Street, York, Pennsylvania, or 628 Elm Street, Chicago 10, Illinois.

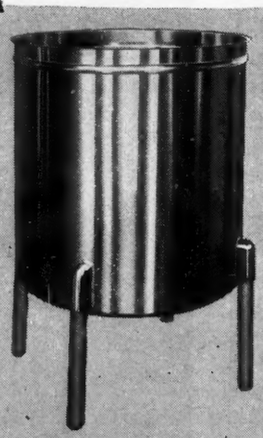
HYDRAULIC PRESSES
FARM EQUIPMENT
FOOD PROCESSING AND
SPECIAL MACHINERY

Farquhar PORTABLE OR PERMANENT MATERIALS HANDLING CONVEYORS

All the Requirements FOR LIQUID PROCESSING

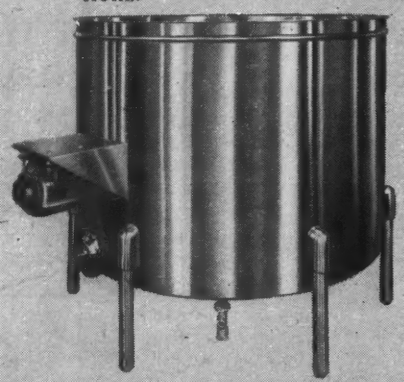


TYPE "H." A mixing or storage tank recommended for low headroom installations.

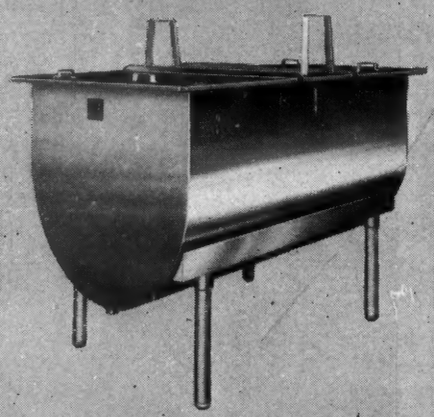


TYPE "J." A modern design open-top San-I-Tank.

TYPE "K." Closed top tank for mixing or storage.



TYPE "L." Large capacity and low sides for shoulder height operation.



TYPE HALF ROUND. An ideal storage vat for processing liquids or foods.

STOCK POTS. Sturdy, stainless steel utility pots.

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Thousands of industries throughout the world are using SAN-I-TANKS to meet their liquid processing requirements. Whether the operation is mixing, blending or storage . . . in tank capacities from five to 5,000 gallons . . . there's a SAN-I-TANK to handle the job.

Experience gained through many years in the tank fabricating industry has resulted in a complete line of modern SAN-I-TANKS. Durable, stainless steel construction assures long-term service and top operating efficiency that meets every sanitary requirements.

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STAINLESS STEEL SAN-I-TANKS

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METAL GLASS PRODUCTS COMPANY

GENERAL OFFICES BELDING 2, MICHIGAN

Changes in Food Supplies

(Indicators)

Materials

Green peas for canning and freezing will cover 433,580 acres, according to early BAE estimates. This acreage will be about 6 percent less than the 1947 planting of 458,740 acres, and compares with the 1937-1946 average of 412,660 acres.

Hatchery production, in April, came to 283,077,000 chicks, about 7 percent less than the number produced in April, 1947. Output was 13 percent under the 1942-1946 average and the smallest April production since 1941.

Lima beans for processing will be increased if the planned 6 percent more acreage than was planted last year materializes. These early plans call for 93,200 acres, compared with 87,630 acres planted last year, and a 1937-1946 average of 61,480 acres.

Storage

Frozen fish and shellfish held in storage, May 1, came to 68,350,782 lb., compared with 70,201,619 lb. held on May 1, 1947.

Public cooler space was 63 percent filled on May 1, which was 5 percent higher than that recorded for April 1, but 5 points below the five-year average occupancy for the date.

Public freezer space was 70 percent filled on May 1. This was a 5 point drop from April 1, and was 3 points below both last year's May 1 holdings and the five-year average.

Production

Creamery butter production, during April, jumped 11 percent above March, the output being estimated at 99,885,000 lb. The average March-April gain in the 1942-1946 period was 10 percent, but the gain last year dropped to 5 percent. On the other hand, total output this year was 15 percent smaller than in April, 1947, and 22 percent smaller than the 1942-1946 April average.

American cheese production, in April, estimated at 73,760,000 lb., rose 25 percent over March, but was down 20 percent from a year ago, and off 2 percent from the 1942-1946 April average. Production for the first four months was off 21 percent from the same 1947 period, and was 5 percent under the 1942-1946 average.

Ice cream production made far less than the usual seasonal gain in April. Estimated at 50,140,000 gal., the March-April increase was only 11 percent, compared with 19 percent, last year and 24 percent average for 1942-1946. April output was also down 5 percent from last year.

Wheat flour, in March, was 20 percent below the March, 1947, production rate. Estimated at 21,800,000 sacks, the production rate was only 69 percent of capacity, the lowest since June, 1946.

Lard output, in April, totaled 120,257,000 lb., compared with the 125,099,000 lb. produced in March.

Frozen vegetables produced in 1947, dropped back to 345,307,359 lb., according to the compilation made by the National Association of Frozen Food Packers. This compares with the 1946 output of 450,000,203 lb., and the 1945 production of 307,977,360 lb. Frozen fruit and berry production was 347,251,212 lb., a severe drop from the 523,281,201 lb. packed in 1946 and 430,176,545 lb. turned out in 1945.

Poultry canned or used in canning totaled 12,477,000 lb., during April compared with 7,409,000 lb. in April, 1946. The amount of poultry canned during the first four months of this year was 57 percent above the same period last year.

Indexes

Business Week's index of business stood at 193.9 for the week ended June 5, which compares with 194.2 for the preceeding week, 191.2 the month before and 186.4 a year ago.

The commodity price index on food, compiled by the New York Journal of Commerce, was 204.5 for the week ending June 12, 204.1 for the preceeding week 202.7 for May and 190.6 for June, 1947.

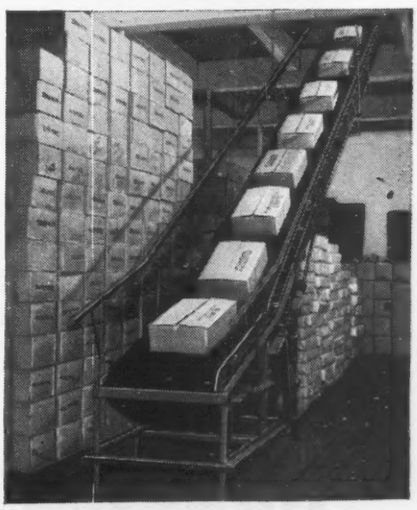
CONSTRUCTION NEWS

	Pending June 1948 (thousands)	Awarded (thousands)	Total (thousands)
Bakery	$6,468	$.....	$ 5,653
Beverages	488	640	10,559
Canning and Preserving	.....	.....	320
Cold Storage	225	.....	1,286
Confectionery	.....	.....	2,253
Grain Mill Products	.....	.....	5,600
Ice, Manufactured	150	.....	70
Meats and Meat Products	368	100	851
Milk Products	1,000	.....	3,254
Miscellaneous	320	70	5,677
	$9,019	$810	$35,523

FROM
FLOOR-TO-FLOOR

WITH EASE AND SPEED ON "STREAMLINER" INCLINED BELT CONVEYORS

These economical, efficient Floor-to-Floor Conveyors for handling packages, cases, cartons, etc. are available in two types: Heavy Duty, with a load capacity of 85 pounds per foot and Light Duty, with a load capacity of 50 pounds per foot. Both types are reversible . . . operate at a constant speed of 45 feet per minute . . . have roller bed construction with rollers "Set High" or "Set Low" . . . are equipped with rough top rubber belt and manual belt take-up for slack. They are available in standard sizes up to 30 inches wide and can be furnished portable or supported from one floor. Write for details.



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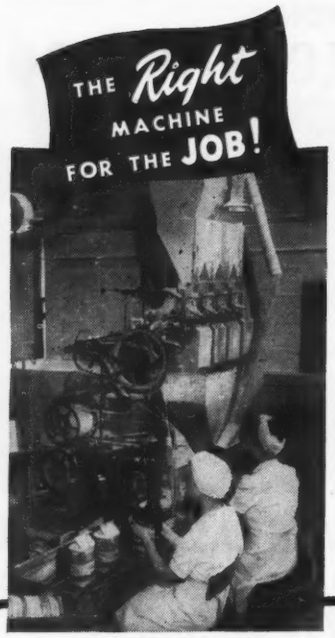
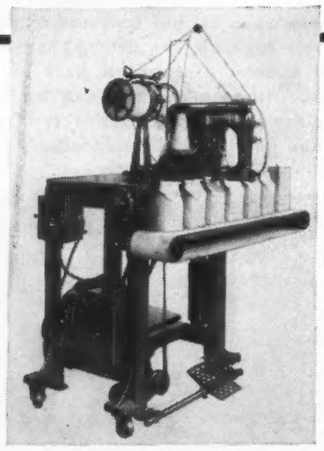


No two jobs are exactly alike—that's why Union Special builds a wide variety of bag closing equipment. It's also the reason why Union Special field representatives make a careful study of requirements before giving you detailed recommendations on the kind of equipment to install. *If it's "Union Special," it's right for the job!* UNION SPECIAL MACHINE COMPANY, 450 North Franklin Street, Chicago 10, Illinois.



Style 21800 N bag closing machine equipped with Style 60000 D sewing head for making Union Special's exclusive Dubl-Tape closure on small paper bags.

Union Special

Bag Closing Machines

What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

HERBICIDE DIET—For 21 days a half gram daily of 2,4-D was eaten in a test of toxicity by Professor Kraus with no serious effects. This wartime personal experiment has lately been announced in Washington where the daring project has had strong compliment. Work continues at the Bureau of Plant Industry to identify possible allergy difficulties. Thus the department researchers hope to establish the necessary restrictions, if any, to protect exposed humans. Results to date seem to indicate no risk to man or warm-blooded farm animals. The food industries will watch this work closely in the hope that weed control will not be handicapped by serious limitations on this potent herbicide.

LEGAL PRICING—In a sweeping decision, U. S. Supreme Court virtually outlawed multiple basing-point pricing systems. But an extremely important distinction was made between habitual discrimination between one customer and another (forbidden by Robinson-Patman law) and the occasional cutting of prices to a customer by freight absorption. This latter is definitely permissible, so it seems from the Court ruling, if done by the seller to meet prices of his own competitors. Food pricing executives are going to need to study the Cement Institute decision very carefully.

LIFE-RAFT RATION — Novel preparation and packaging of a life-raft ration is needed by the Navy. Currently that agency is developing an experimental pack of 100,000 units, which include sucrose citric acid tablets, sucrose lipid acid tablets, sucrose malted milk tablets, multiple vitamin tablets, chewing gum, and a waterproof bag to hold the unused portions of the ration. Here is a chance to collaborate with the Navy and become acquainted with potential big business of a later day. It typifies the kind of cooperation that all of the military departments need and seek. Initial cooperation is not prospectively very profitable. But the later follow-up on big routine orders may prove to be.

IN THE RESERVE?—Men who left active military service to take reserve officer positions had better look into their prospective status. A number of the technical corps executives about Washington are talking about calling such men for the maximum permissible "training." The patriotic gesture may turn out to be a commitment that, at least, will absorb normal vacation time. The smart reserve man will look into his personal status, and soon.

WRONG INDEX—Sometimes the dollar-and-cent index is not alone a safe measure of plant efficiency. Sometimes it is necessary to use also, a measure of the man-hours consumed overall per unit of product made. That is of increasing importance as the cost of the man-hour goes up with each round of wage increases. Perhaps the board of directors will listen best to arguments for labor-saving machinery if presented on the basis of man-hours saved. They will take comfort in the prospect that these man-hours will keep on growing in importance even as the machine wears out.

DISPROPORTIONATE—European relief is boosting certain prices for food raw materials far beyond the expectation of many. Most folks forget that a small deficiency in supply as compared with demand may cause a large price rise. Apparently this accounts for the spring jump in edible oil prices. Prospective and real purchasing for European relief created both apparent and real deficiencies with consequent market scramble and price rise. Spot deficiencies near the end of the fat-and-oil season are not cushioned by immediate supply from the new crop as they will be later in the summer. Many food fat users have suffered.

ENFORCEMENT — Differential pricing among customers of like class is viewed as illegal by the more zealous workers in the government agencies

CHANGE OF ADDRESS

DIRECTOR OF CIRCULATION, FOOD INDUSTRIES
330 WEST 42nd STREET, NEW YORK 18, N. Y.

Please change the address of my Food Industries subscription.

Name .....

Old Address .....

New Address .....

New Company Connection .....

New Title of Position .....

involved. Justice Department officials think they have got in several recent court cases important backing. Apparently they are going out more vigorously than ever to enforce the letter of the law. Food companies, apparently quite vulnerable, need to be supercareful for awhile.

BUY SOON—Users of fruits and vegetables likely to be pest ridden should help their farmer suppliers to be ready with needed insecticides. Only a few types like DDT and pyrethrum are certain to be available in plentiful or adequate supply. Crops that may later need the arsenates, nicotine, and synthetic insecticides cannot be properly sprayed if users wait until the last minute and then attempt to buy from dealers having only depleted stocks. Official warnings suggest, "Order Insecticides Early!"

WORKER COMFORTS — Scarcity of food factory labor continues a serious problem in some industrial areas. An amazing difference in ability to get new workers is reported from some. Not a negligible factor has often been found in providing personnel facilities. The best workers, just like the boss, welcome a clean wash room, decent locker, and the other physical facilities that contribute to comfort and self-respect.

SPONTANEOUS—Spontaneous heating during transport has been discovered in two food materials investigated by the Bureau of Explosives last year. Both corn meal and bran are subject to dangerous development of what may be spontaneous fires in extreme conditions. To prevent this difficulty in finely ground cereal materials, two precautions are necessary. Materials should be packed and shipped with moderate moisture content, usually not over 7 percent of water, especially in the case of bran. Packing and loading while still warm is a dangerous practice. Cereal manufacturers, who do not want to have warehouse fires and losses of product in transportation can well observe these two precautions.

PRODUCTION RESEARCH — Large expansion in facilities for scientific research into better food-production methods is forecast from the transfer of 26,000 acres of government surplus property to various educational institutions. Nearly a dozen schools have been granted acreage at 100 percent discount by War Assets Administration. These will be operated as a part of the Land Grant College system of state activity, in a number of cases permitting greatly enlarged studies for both crop and animal projects.

RETALIATION — Dairy state congressmen are unhappy over their losses in the restriction of margarine. Retaliatory efforts effecting cotton, tobacco and other nofood crops may be expected. And the "dairy boys" are not noted for kid glove tactics.

"Answer this question, Homer Sneet, And you'll be living on Easy Street!"

Emcee: "How much does it cost, by Air Express
To ship 10 pounds 1200 miles, no less?"

Homer: "Why didn't you ask me that *before?*
All it costs is $3.84!

"I use it many times each day—
It's the fastest possible way to make hay!
Easy Street's *already* my address,
Thanks to Scheduled Airline Air Express.

"What's more you get *door-to-door* service, too
—And all at *no extra cost* to you.
In these days of price inflation
Air Express rates are cause for elation!"

Specify Air Express-World's Fastest Shipping Service

- Low rates—special pick-up and delivery in principal U. S. towns and cities at no extra cost.
- Moves on all flights of all Scheduled Airlines.
- Air-rail between 22,000 off-airline offices.

True case history: Truck and auto parts comprise big portion of Air Express shipments. Keep equipment rolling! Typical 36-lb. shipment picked up Detroit late afternoon, delivered Salt Lake City noon next day. 1507 miles, Air Express charge $16.58. Any distance similarly inexpensive. Phone local Air Express Division, Railway Express Agency, for fast shipping action.

AIR EXPRESS
GETS THERE FIRST

Rates include pick-up and delivery door to door in all principal towns and cities

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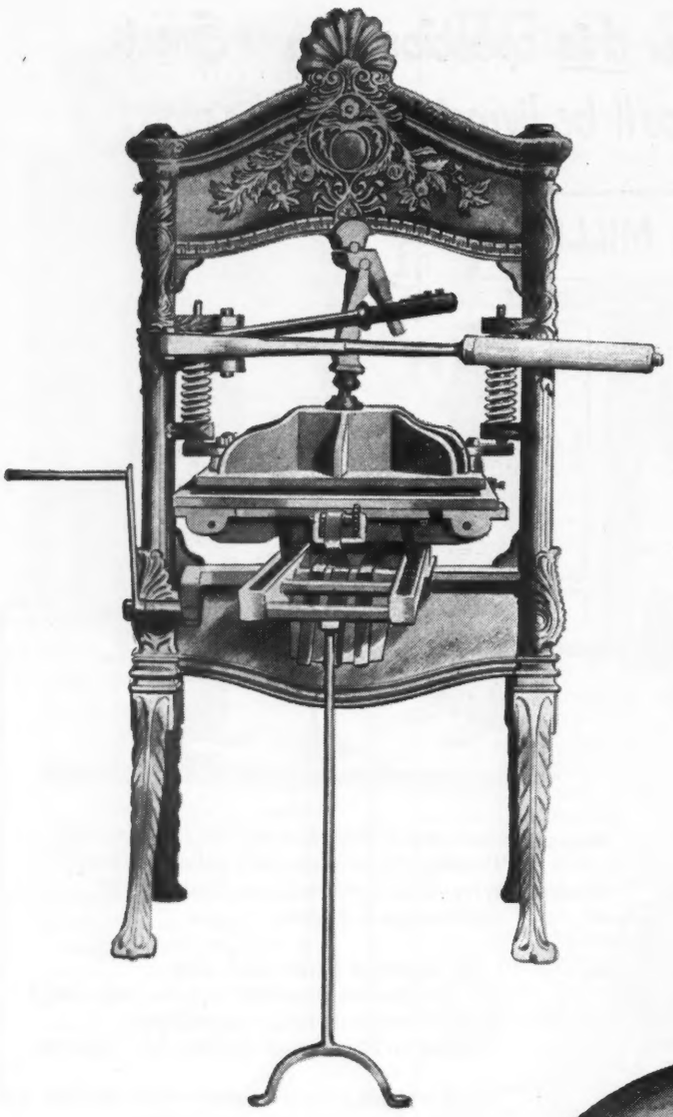

Screw hand press

Squaring shears

Tinsmith by necessity!

Using a screw hand press . . .

. . . a pair of squaring shears . . .

. . . and other simple tools . . .

. . . *the fishermen and canners of another day were ready to start canning, if they could find the proper raw materials.*

Yes, they had to be tinsmiths, too.

This *was* the situation in the fishing industry. Canco overcame it.

Canco developed machines to make cans for tuna, salmon, mackerel, sardines, and many other kinds of fish . . .

. . . besides machines to close these cans up to 175 per minute.

Canco sent out expert servicemen to the fisheries themselves, ready to help Canco customers.

Indeed, Canco has played such an important role in the fishing industry as it is known today that we rightly feel ourselves an integral part of it.

The willingness to do new things . . . to pioneer . . . is part of Canco. Fishing is only one frontier of packaging where we have helped our customers.

CANCO

AMERICAN CAN COMPANY

New York • Chicago
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MEN • JOBS • COMPANIES

INDUSTRY

Affiliated Canners, Inc., New York City, has taken over entire sales of Canandaigua Kraut Co., Canandaigua, N. Y., and B. F. Canners Co-op, Fredonia, N. Y.

Airline Foods Corp., New York City, has announced acquisition of Mission Garden Co., Inc., N. Y. C., tea packer, and also Warren Dried Fruit Co., San Jose, Cal.

Mrs. Bairds Bakeries is constructing a $400,000 bread plant in Abilene, Tex.

The Borden Co. has completed a new milk processing and ice cream manufacturing plant at Midland, Tex.

Dr. Pepper Bottling Co., Chicago, headed by H. C. Eggleston, former president of Pan American Food Products Co., has started production under a franchise arrangement with parent firm of Dallas, Tex.

Churngold Corp. Cincinnati, has purchased The Gold Leaf Margarine Co., Cedartown, Ga.

Coble Dairy Products, Inc., of Lexington, N. C., has taken over operation of Dixie Dew Ice Cream Co., Rock Hill, S. C.

Chemical Div. of The Borden Co. is name of new division formed by amalgamation of Casein Co. of America and Durite Plastics Div. of The Borden Co.

Gerber Food Products Co., Fremont, Mich., has leased 85,000 sq. ft. of space at Horseheads Holding Point, Horseheads, N. Y., for storage purposes.

Gioia Macaroni Co., Rochester, N. Y., is reported negotiating for purchase of a plant in Newark, N. Y.

Imperial Rice Milling, Inc., Crowley, La., has been purchased by Harry Redman and Lance McBride for $200,000.

Kraft Foods Co. has moved its process cheese manufacturing operations from Atlanta, Ga., and Water Valley, Miss., to a plant in Nashville, Tenn. A. B. Holland, formerly in charge of Water Valley plant, has been appointed manager of Nashville organization.

Libby, McNeill & Libby has purchased one of midwest's largest corn and pea canneries located at Rochester, Minn. Plant was formerly operated by Reid, Murdoch Div. of Consolidated Grocers Corp.

DR. ROY C. NEWTON

Recipient of Honor Scroll of American Institute of Chemists, awarded annually for distinguished service in field of chemistry. Dr. Roy C. Newton is vice-president in charge of research for Swift & Co. He is honored for his research achievements and for his strong influence in furthering scientific food processing methods. Presentation will be made at fall meeting of Chicago chapter of institute.

Central Soya Co. of McMillen Feed Mills has recently begun operations in its new soybean oil solvent extraction plant at Gibson City, Ill.

Los Angeles Brewing Co., maker of Eastside Beer, has been sold to Pabst Brewing Co. of Milwaukee. L. A. plant will continue to produce Eastside Beer, and a new brewery will be built on adjacent land to produce Pabst beer. Transaction was described as a multi-million dollar deal.

Maple Leaf Milling Co., of Canada, is completing $750,000 modernization and expansion program in its West Toronto plant.

Peter Paul, Inc., candy co. with headquarters in Naugatuck, Conn., announces beginning of operations in firm's new plant at Dallas, Tex. Production of about 1,000,000 boxes of candy per month is expected.

Ralston-Purina Co., St. Louis, will erect a $1,500,000 plant in Bloomington, Ill., for processing soybean solvent, oil and meal.

Welch Grape Juice Co., and **Ontario Grape Growers Co-Operative** are jointly building a new plant at St. Catherines, Ont., estimated to cost $500,000.

Fire Losses—Daniel Brothers Packing Co., meat processing plant at Columbia City, Ind., was destroyed May 21 with estimated loss of $300,000 . . . Green Wholesale Coffee Co., Indianapolis, Ind., was damaged May 1, with estimated loss of $10,000 . . . Stokely Foods', Celina, Ohio, two-story brick office and warehouse plant was destroyed Apr. 13 . . . Walter Baker Chocolate Co. plant at Dorchester, Mass., was damaged on May 13 by fire, confined to fourth floor of building. Estimated loss: $10,000.

The newly organized Canada Dry Bottling Co. of Denver, backed by a Houston group and under franchise from Canada Dry Ginger Ale, Inc., Los Angeles, is now in operation in the old Standard Bottling Co. plant at Denver. Cost of remodeling and installation of equipment was nearly $100,000. Through freight savings, the new plant will offer lower prices locally on Canada Dry products—ginger ale, club soda, Spur Cola, Hi-Spot, Tom Collins Mix, and orange, grape and root beer flavored drinks.

National Biscuit Co. has purchased a 25-acre tract at Portland, Ore., from Union Pacific Railroad, and plans construction of a $3,000,000 bakery on the site. To be completed in 1950, new plant will be company's largest and will supply Oregon, Washington, Idaho, Alaska and Northern California with about $1,500,000 worth of products monthly. Between 900 and 1000 persons, 70 percent women, will be employed in the 350,000-sq. ft. bakery, which will take the place of the present Portland bakery employing 150. Flour will come from Nabisco's own mill at Cheney, Wash.

PERSONNEL

Ralph W. Bunge has resigned from Standard Brands and will establish a consulting office in Chicago. He has had 33 yr. of experience in designing yeast plants and equipment for the industry.

J. D. Campbell has been appointed head of export department of Swift & Co., Chicago. Since joining the packing house in 1915, Mr. Campbell has seen company service in France, Italy, Switzerland and England.

Thomas B. Cabot has been elected president of United Fruit Co., succeeding Samuel Zemurray, who has become chairman of board.

Clinton O. Dicken, vice-president and general manager of E. J. Brach

Guardians OF THE NATIONS FOODS

DETROIT
1448 WABASH AVE.
ZONE 16

CHICAGO
2101 W. PERSHING RD.
ZONE 9

UNITED STATES COLD STORAGE

Four Modern Fortresses For Guarding The Nation's Foods

DALLAS
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ZONE 2

WRITE FOR DETAILS

KANSAS CITY
500 EAST THIRD ST.
ZONE 8

EKEM for efficient filling

Simply . . .
Cleanly . . .
Correctly . . .

"EKEM" with world-wide reputation. Unique in design based on latest developments in scientific research.

"EKEM," the most outstanding and efficient machine for solving filling problems.

Firms of reputation invited to take over agency and manufacture for the United States and Canada.

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HEADQUARTERS OF
EKEM ENGINEERING (S.A. PTY.), LTD.
29, KERK STREET, Corner HARRISON STREET,
JOHANNESBURG. P.O. BOX 947.

C. A. ABELE

Director of Country Dairy Inspection Section, Chicago Health Department, since 1940 and past president of Chicago Dairy Technology Society. C. A. Abele has resigned to serve as director of public health research of The Diversey Corp., Chicago.

& Sons, Chicago, has been elected a director of company. He fills vacancy created by death of Emil J. Brach, president and founder.

Edward Doucette, formerly president of Epicurean Club, Boston, is now manager of consultant chefs at Amino Products Div., International Minerals & Chemical Corp., Chicago. He will direct consulting service for hotels, restaurants and institutions on use of monosodium glutamate and liquid seasoning in prepared food.

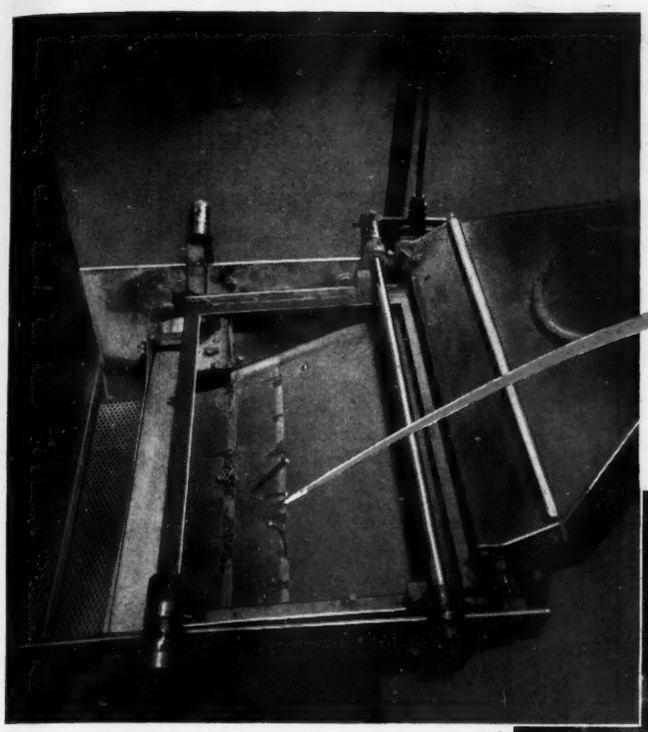
C. W. Hazen, Memphis, was named president of Valley Oil Seed Processors Assn. at two-day convention held in Biloxi, Miss. W. H. Lilliard, Fort Smith, Ark., was elected vice-president, and C. E. Gardner, Memphis, was re-elected secretary.

Dr. William R. Johnston has been appointed Director of Research of Standard Brands, Inc. His headquarters will be Fleischmann Laboratories. Dr. C. N. Frey, Director of Scientific Relations, will be located at company's home office for consultation liaison between executives and laboratory. Dr. C. G. Ferrari will be assistant to Dr. Johnston.

Lester W. Jones, director of purchases of McCormick & Co., Inc., Baltimore, was elected president of American Spice Trade Assn. during recent 42nd annual convention in New York.

Kenneth S. Keyes, prominent Miamian, was re-elected president of Florida Lime & Avocado Growers Assn. George Batcheller was elected vice-president; Fred Pioway, secretary; and J. W. English, treasurer.

Loe Ovson, Ovson Egg Co., Chicago, has been elected chairman of technical committee, National Egg Prod-

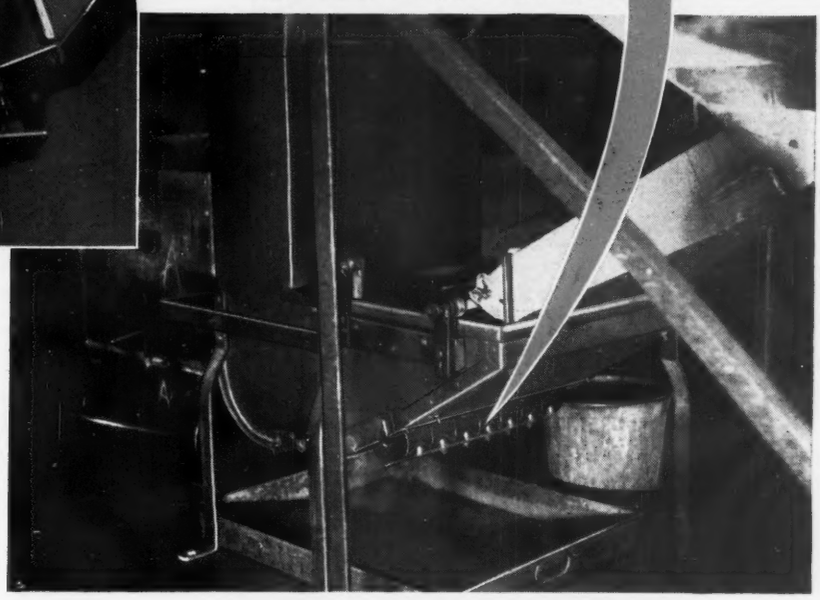


HERSHEY'S

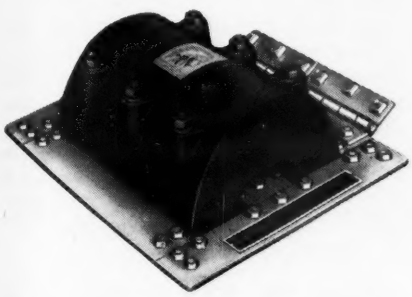
Are protected by

55 Eriez

NON-ELECTRIC *Permanent* MAGNETS •



Installed ahead of an air-lift cleaner, this Eriez magnet removes tramp iron from cocoa beans in process.



MORE ERIEZ PROTECTED PLANTS PROCESSING FOODS

Campbell Soup Co.
Beechnut Packing Co.
Bruce's Juices, Inc.
H. J. Heinz Co.
The Quaker Oats Co.
Birds Eye-Snider Div. (General Foods)
National Biscuit Co.
Atlantic & Pacific Tea Co.
Pepsi-Cola Co.
Lipton's Tea Co.
Pillsbury Flour Mills
Swift & Co.
American Tobacco Co.

HERSHEY CHOCOLATE CORPORATION USES ERIEZ TO PROTECT MACHINERY AND PRODUCT

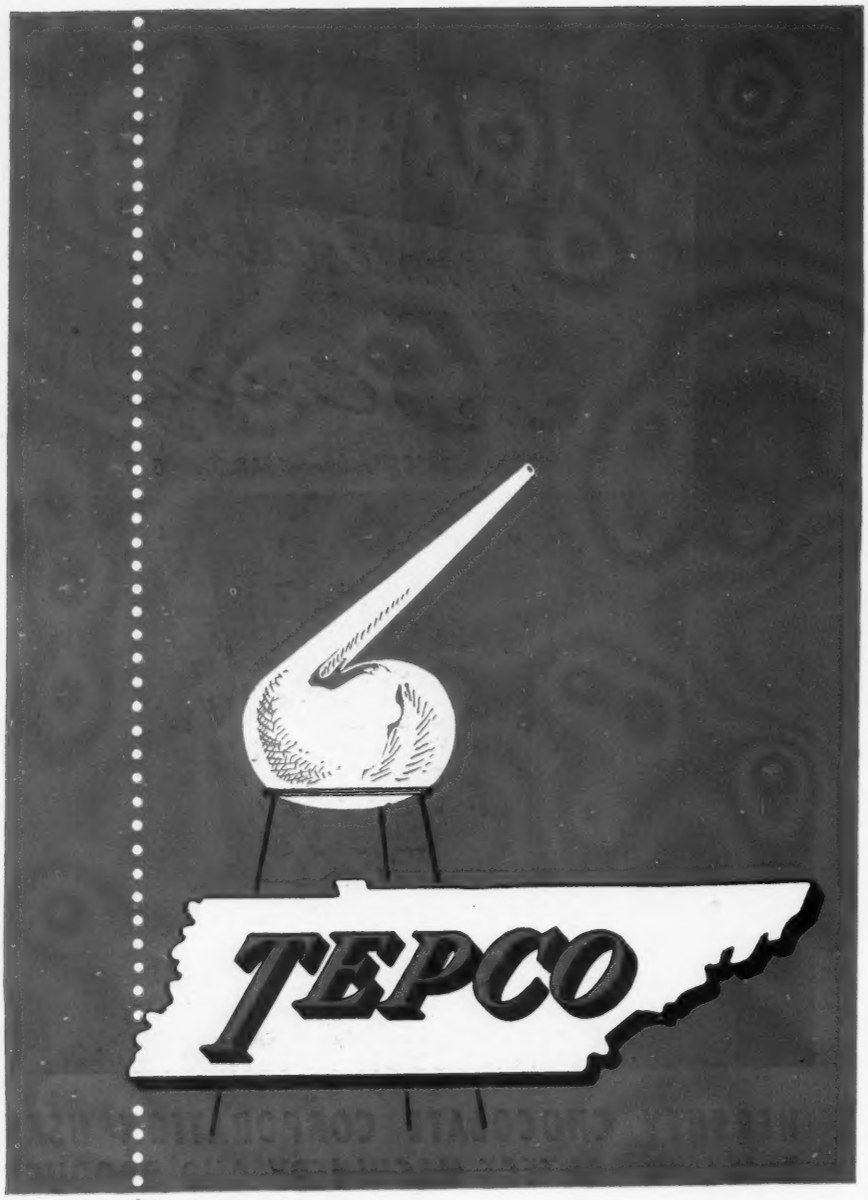
THROUGHOUT Hershey's modern, well equipped plant, you'll find Eriez non-electric permanent magnets removing tramp iron and metal contamination. By the efficient removal of this ferrous material, Eriez magnets eliminate costly shutdowns, protect machinery from damage and assure purity of product. Eriez makes a complete line of non-electric magnetic separators for every purpose . . . no matter what food product you are processing—or what your metal contamination problem may be—there is an Eriez magnet to do the job . . . The initial cost is low . . . and first cost is last cost . . . Write for Bulletin 108 — it can result in great savings to you.

CLIP AND MAIL TODAY
Please send bulletin No. 108. We are interested in removing tramp iron or ferrous particles from the following materials:.....
We would like to know more about installation of ERIEZ on: FI-7
☐ Gravity Conveyors ☐ Mechanical Conveyors ☐ Pneumatic Conveyors
☐ Liquid Pipelines Magnetic Trap ☐ Equipment or Processing Machines

Name.....
Address.....City.....State.....

● *When It's Magnetic Protection . . . See Eriez First*

ERIEZ MANUFACTURING COMPANY
101 East 12th St.



Sodium Benzoate U.S.P.

Absolutely of the highest purity, fine-flake Tepco Sodium Benzoate (U.S.P.) gives uniformly BETTER SOLUBILITY.

PROMPT SERVICE TO ANY PART OF THE U. S.

Tennessee Products & Chemical Corp.

General Offices: Nashville, Tennessee
Eastern Sales Office: 350 Fifth Avenue, New York 1, N. Y.

ucts Assn., Chicago. Other members of Committee: O. J. Kahlenberg, Director of Research, NEPA; Leon Mink, Swift & Co.; William Loy, Wilson & Co.; A. B. Rogers, Armour & Co.; Arthur Rapport, Ovson Egg Co.; A. K. Epstein, Emulsol Corp.; W. H. Tonkin, Standard Brands, Inc.; and M. Sichel, Joe Lowe Corp.

Russell M. Smith, national manager of canned meats division of Wilson & Co., and head of company's dog food division, has been elected president of National Meat Canners Assn.

Fred W. Stenze, Jr., and **Sam J. Renz,** packaging engineers, have been added to staff of Quartermaster Food & Container Institute for Armed Forces, Chicago. Both men have been assigned to packing and crating branch.

Linnell E. Studley has been appointed factory manager of New England Confectionery Co., Cambridge, Mass. He succeeds R. W. Moulton, resigned.

George W. Toeller has been elected president and general manager of Battle Creek Food Co., Battle Creek, Mich., succeeding Dr. James T. Case.

C. Richard Drescher has been appointed production manager in charge of quick-frozen fish and poultry products for Snow Crop Marketers, Inc., New York City. He was formerly general manager of White Mountain Poultry Co., plant manager of Long Island Duck Packing Corp, and production organizer of Aberj-jona Div. of General Foods Corp.

Joseph R. Wagner, formerly in charge of nutritional research, Libby, McNeill & Libby, Blue Island, Ill., now heads fruit and vegetable branch of food development division, Quartermaster Food & Container Institute for Armed Forces, Chicago.

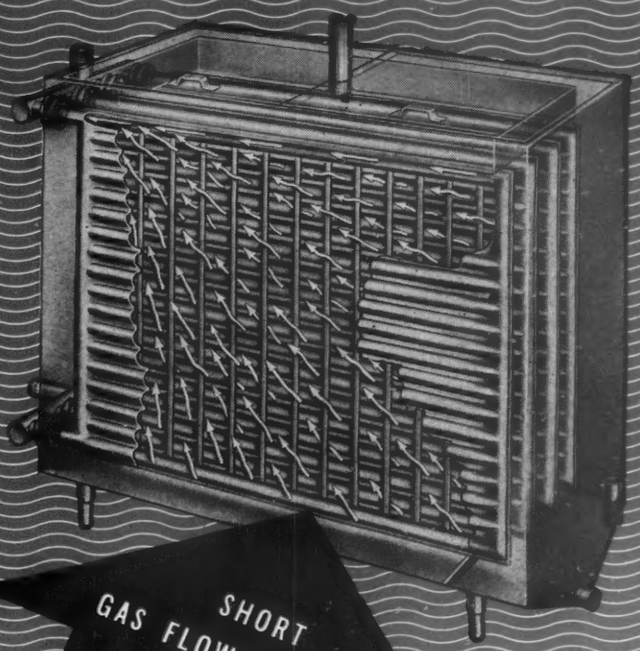
Virgil O. Wodicks, formerly manager of cereal laboratories Ralston Purina Co., St. Louis, succeeds J. R. Wagner (see last item) as head of nutritional research for Libby, McNeill & Libby at Blue Island, Ill.

ASSOCIATED INDUSTRIES

Brown Instrument Co., Philadelphia, has announced plans for a $2,500,000 expansion program which will add more than 60 percent to its present manufacturing space, with a relative increase in employment.

Chase Bag Co. continues its expansion program with acquisition in Los Angeles of a modern bag factory

OOL AT LESS COST with JENSEN low temperature Chilled Water Units



SHORT GAS FLOW PRINCIPLE

Note that the longest gas escape route can be no greater than the diagonal of the cooler section—a direct operation not attainable with serially connected tube sections.

The Jensen "short gas flow" principle

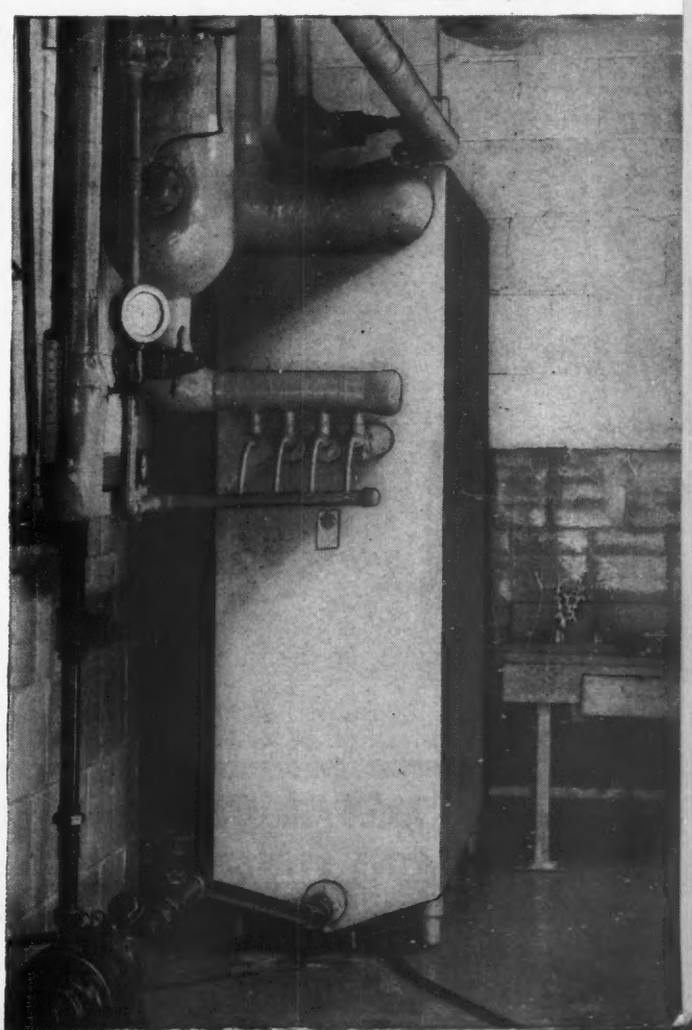
(1) **Provides you with all the low temperature (down to 32°) water you want,** 24 hours a day, without icing up. Operates at higher refrigerant temperature than any other machine.

(2) **Cools at less cost,** because the unique construction of the cooling section permits operation at unusually high back pressures . . . compressor tonnage is increased . . . power costs reduced.

A storage tank of any desired capacity can be provided and the unit operated as a single pass or recirculating cooler. Any industrial refrigerant may be used. Microorganisms and mineral deposits are easily removed.

BELOW

Jensen Chilled Water Unit operating in Vick Chemical Co.'s Wayne Junction, Philadelphia plant. It consists of three stainless steel sections, with space for a fourth. Capacity: 18 tons of water per hour. Note compactness.



JENSEN MACHINERY COMPANY, Inc.

Bloomfield, N. J. Chicago, Ill. Oakland, Calif.

Whether used in freezing, canning or dehydrating . . . on sorting tables, in scalders, washers or cookers . . . for bulk or packaged goods . . . La Porte Flexible Steel Conveyor Belting gives efficient, worry-free service. Its non-corrosive metal is not effected by steam, water or extreme temperatures. Its strong, flexible construction will not stretch out of shape . . . slip . . . weave . . . or jump. It is easily and quickly cleaned and sterilized with steam or hot water, and no special dressings or belt lacers are needed to keep it in peak condition.

Ask your Supplier Today. Available in any length and practically any width.

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

OLD EQUIPMENT WORN OUT?
look to **LEE** *Kettles*
FOR CORROSION-RESISTANT EQUIPMENT

WRITE FOR NEW INFORMATIVE BULLETIN

LEE METAL PRODUCTS CO. INC.
416 PINE STREET . . . PHILIPSBURG, PA.
ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

formerly operated by Southern California Bag Co. Chase branches now total 15.

Celanese Corp. of America announces election of George H. Richards, former vice-president and treasurer, to its board.

Lukens Steel Co., Coatesville, Pa., announces appointment of L. P. McAllister as manager of its steel plants.

Elgin Softener Corp., Elgin, Ill., has appointed William F. Brandt as district engineer of Minneapolis territory, which includes Minnesota, North Dakota, South Dakota and northwestern Wisconsin.

Paisley Products, Inc., Chicago, has named Sam Schuller as technical director of firm's combined operations. Mr. Schuller is well known for his development of new adhesive products.

Winthrop-Stearns, Inc., has formed a special markets-industrial division to give more efficient service to the food industry relative to the company's bulk vitamins, food enrichment agents, and other special products.

DEATHS

George Royal Barker, 75, General Foods Corp. executive, May 7, in Los Angeles, where he had resided for past 13 yr.

Adolph W. Ewers, 75, former secretary of Arnold Brothers, Inc., Chicago (before its merger with Swift & Co. in 1936), May 5, in Chicago.

Charles W. Field, 80, retired secretary-treasurer of Ballard Ice Cream Co., Indianapolis, Ind., Apr. 14.

Frank James Geiger, 94, former manufacturer of Virginia Sweet products in Indianapolis, Ind., Apr. 11, at his home in that city.

Edward C. Hartman, 56, director and treasurer of Stahl-Meyer, Inc., New York City, Apr. 24, at his home in Floral Park, L. I.

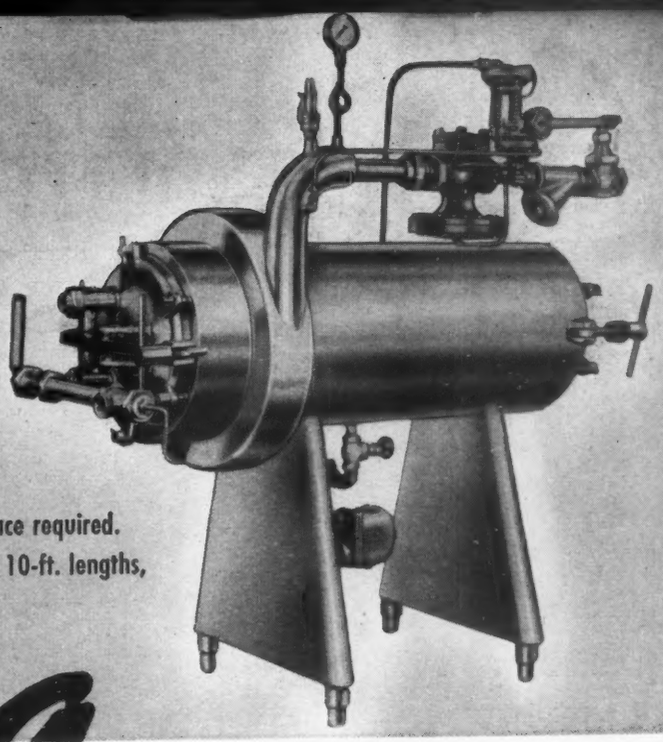
Carroll L. Post, 88, former president of Postum Cereal Co., Battle Creek, Mich., Apr. 27, at Pasadena, Cal.

Ralph S. Stubbs, 65, vice-president of American Sugar Co., New York City, Apr. 27, while vacationing at Sea Island, Ga.

Charles W. Taussig, 51, president and chairman of board of American Molasses Co., and subsidiaries including Sucrest Corp. and Nulomoline Co., suddenly May 9, at his home in Bay Shore, L. I.

MOJONNIER TUBULAR HEAT EXCHANGERS

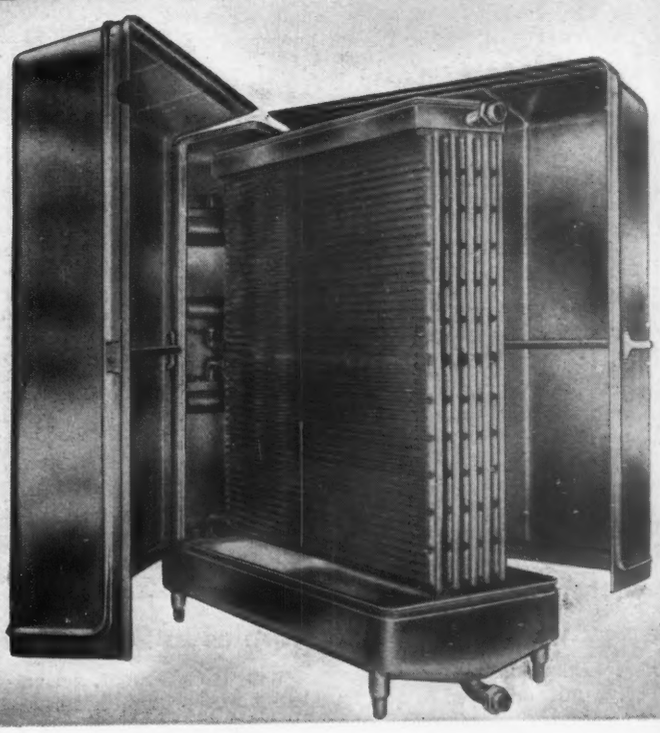
tant heating to above 200° F. with exact temperature control.
ick, easy cleaning — only two doors, two gaskets.
nplified controls — streamlined design.
tomatic desuperheating insured by tangential steam entry.
continuously and automatically removed.
parts in contact with product are of stainless steel.
ntinuous condensate removal.
stom-engineered for each particular application.
cked by years of heating engineering experience.
mpact, packaged unit, ready for immediate installation. Minimum floor space required.
rnished in 23 models; wide range of sizes and capacities. Available in 5-ft., 10-ft. lengths, in, one above the other to fit any space.
nd for your copy of Bulletin No. 164 today.



Heating or Cooling

MOJONNIER COMPACT COOLERS

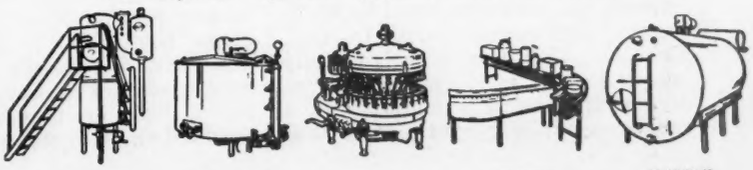
ooling down to 38° F. *in seconds.*
irect ammonia cooling — eliminating all intermediate heat transfer ystems.
ow cost operation — all stainless steel construction for lifetime service.
ow handling wide range of applications from thin to heavy viscous oducts.
eally adapted to sweet water cooling.
ide range of capacities — from 300 to 60,000 lbs. of product per hour.
ctions fan out for fast, easy cleaning.
lexible — cooler housing provides for additional sections to be added ter to increase capacity.
mpact, packaged unit, ready for immediate installation. Occupies inimum floor space.
cked by long cooler engineering experience and thousands of success- l cooler installations on all types of liquid food products. Send for ulletin No. 153 today.



OJONNIER BROS. CO., 4601 WEST OHIO STREET, CHICAGO 44, ILL.

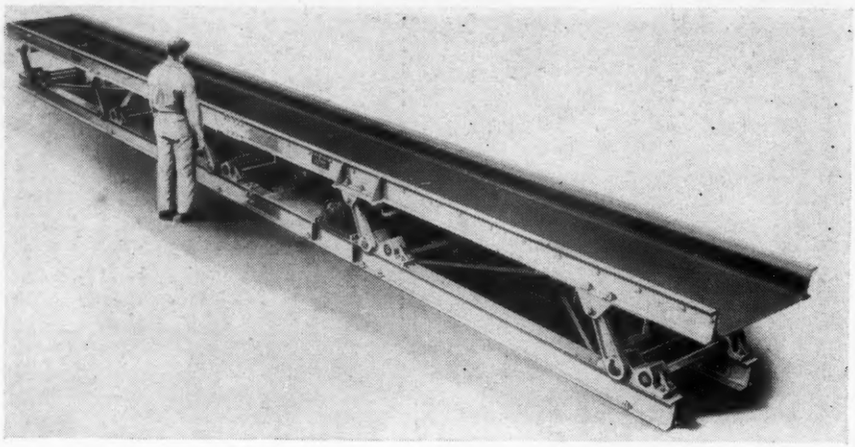
Mojonnier

Other Mojonnier Engineered Equipment Serving the Food Industries



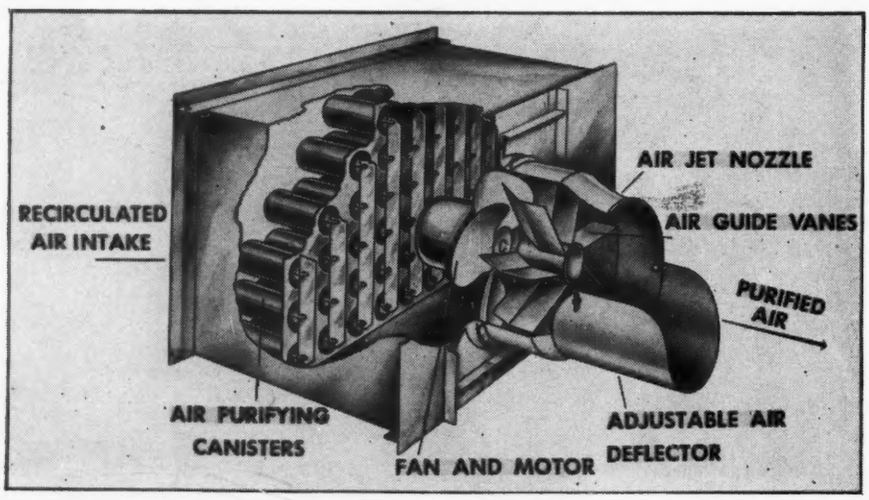
Fruit Spread Cookers | Zone-Control Vats | Vacuum Fillers | Conveyors (Bottle, Case, Can) | Cold-Wall and Plain Storage Tanks

FOOD EQUIPMENT NEWS



Positive-Action Oscillating Trough Conveyor 1

CALLED the Link-Belt "PA", new conveyor is a positive action oscillator type for handling a wide variety of materials in a horizontal path. Maker is the Link-Belt Co., Dept. I, Chicago. The unit is a roller bearing conveyor driven by a Link-Belt Electrofluid Drive through a chain or V-belt reduction to the machine's eccentric shaft and connecting rod assembly. It is available in standard trough widths of 12 to 48 in., to suit capacity desired and character of material to be handled, and in single trough lengths up to 100 ft. For longer carrying runs, two or more units may be arranged in series, one discharging into the other, and each equipped with an individual motor drive. Besides conveying material new PA oscillator may also serve as a cooler, drier or conditioning unit when jacketed, louvered or otherwise constructed for the service intended. Trough is either pan type or constructed with channel steel sides. It is leak-proof and can be furnished with dust-tight covers or constructed for air- and gas-tight movement of material. Corrosion and heat resistant metals may be used.

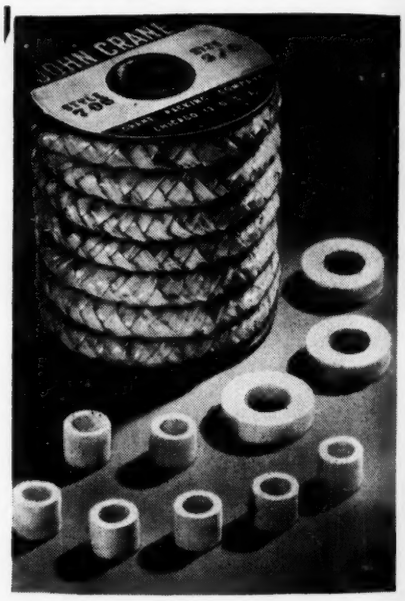


Air Purification for Apples in Storage 2

DOREX apple storage air purification unit, designed to add four to six weeks to the storage life of apples, control or reduce skin scald, and generally preserve quality, thus enabling growers to hold their fruit for the best markets, has been announced by W. B. Connor Engineering Corp., Dept. I, New York City. Operation is entirely independent of refrigeration machinery. Unit consists essentially of a cabinet containing purification element, activated carbon-filled canisters, and a fan and motor to provide circulation. Air guide vanes straighten air currents, which are further channeled by a special jet nozzle. An adjustable deflector makes it possible to divert air in any required direction. Capacities range from 5,000 to 20,000 bushels, and units, either singly or in multiple, may be adapted for any size storage or layout. Units are portable, but may be mounted on floor, wall or ceiling.

Packings for Valves 3

IMPROVEMENT in packing valves, centrifugal and rotary shafts, reciprocating rods, and other points, with Teflon, is announced by Crane Packing Co., Dept. I, Chicago 13. The new Crane products will be listed as the "Chemlon" line. Teflon is E. I. du Pont's chemically resistant flexible plastic noted for its inertness. It is reported not affected by any solvent acid mixtures, acids, or caustic solutions at temperatures to 690 deg. F. It is an efficient sealing protection against escape of liquids, fumes or gases of a highly inflammable or corrosive nature. Round cross-section braided spool-form Teflon packings are available in sizes ⅛ in. to 1 in. on spools. Style 706 is treated with a special chemically resistant lubricant that in itself is unaffected by acids or caustics to 300 deg. F; Style 704 is braided of Teflon alone, and is recommended for applications where operating temperatures are beyond 300 deg. F.



Pressure Controller 4

NEW LINE of Nullmatic pressure regulators for sub-atmospheric applications, including models with barometric compensation for regulating at absolute values, is announced by Moore Products Co., Dept. I, Philadelphia 24, Pa. These industrial-type instruments are designed to hold set values constant, regardless of changes in flow or variations in supply pressure. They may be described as pressure controllers, since they use pneumatic "null" balance system in which main valve is operated by a pilot nozzle. This nozzle operates with a constant differential-pressure, which holds nozzle seat at essentially same position for each set value.

Auto-Close Doors 5

AN INSULATED auto-close swinging door is now being manufactured by Jamison Cold Storage Door Co., Dept. I, Hagerstown, Md. of sturdy, metal-clad construction, doors readily push aside when an electric truck or other heavy duty transportation conveyance truck contacts them. They will return automatically to their original position after truck has passed. Ability to withstand shocks and bumping of this type makes them practical and time-saving for quick and easy passage. At the same time they effectively separate and isolate two areas or rooms. Doors operate without springs or air pressure control. As they swing open, they lift slightly and move a two-way gravity cam which operates in an enclosed housing bolted to upper portion of side jamb and head jamb. Return of cam by gravity closes doors.

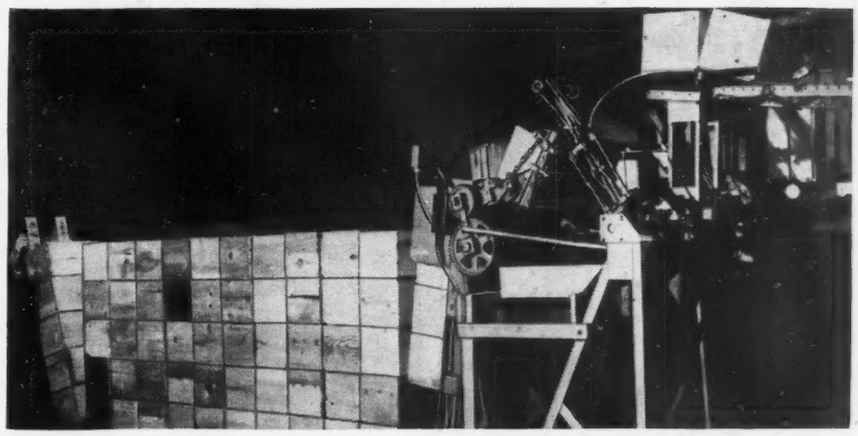
Relief Valves 6

NEW hydraulic and pneumatic relief valves have been introduced by The Parker Appliance Co., Dept. I, Cleveland, Ohio. The valves are available in five pressure ranges: 0-15, 10-50, 40-125, 115-250 and 235-450 psi.; and they can be easily set, by means of external adjustment, to any operating pressure in the particular pressure range involved. Adjustment is effected by positioning a threaded cap, which determines spring pressure on shut-off piston. Cap is sealed by a threaded follower ring, which compresses an O-ring held in cap. Full series of pressure ranges are available in each of six basic sizes from ¼ to ¾ in. Sizes of 1 in. and larger, as well as pressure settings to 1,000 psi., are obtainable on special order.

Fork Truck

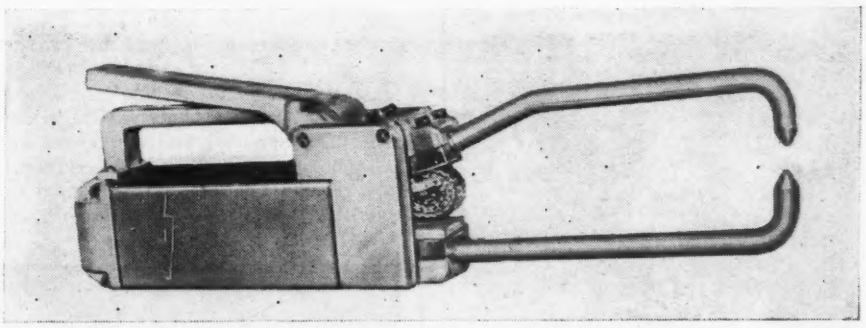
NOW IN PRODUCTION at Industrial Truck Div. of Clark Equipment Co., Dept. I., Battle Creek, Mich., is the Yardlife "60" pneumatic-tired fork

truck of 6000-lb. capacity. This heavy-duty machine completes the company's series of pneumatic-tired machines, which include the Yardlift "40" and Yardlift "20", of 4000 lb. and 2000 lb. capacities, respectively.



Automatic Apple Box Dumper Machine 8

FOOD MACHINERY CORP., Dept. I, Riverside, Cal., announces a new apple dumper. Now being introduced at Cowiche Apple Growers packing house at Cowiche, Wash., this machine is expected to reduce bruising more than 25 percent by automatically dumping stacks of loaded field boxes. It is an improved model of the trial machines which Earl W. Carlsen, director of research for the Washington State Department of Agriculture, reported as proving to be 20 to 25 percent better than careful hand dumping. Machine is expected to increase pack-out 300 to 500 boxes a day. It picks up five to ten boxes a minute from stacks; automatically turns them over, emptying out the apples onto a belt for grading; then pushes empty boxes onto a conveyor. Rate of dumping can be easily varied. A sponge-rubber padded lid cuts down on stem puncture and bruising.



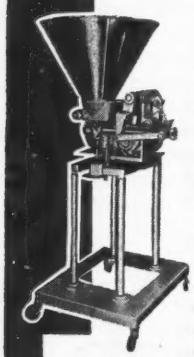
Portable and Self-Operating Spot Welder 9

A NEW lightweight completely portable and self-operating spot-welder is announced by Greyhound A. C. Arc Welder Corp., Dept. I, Brooklyn 6, N. Y. Described as an essential tool for sheet metal and truck and body repair shops, it welds up to ⅛ in. combined thickness of metal. The unit is enclosed in a compact non-corrosive cast aluminum casing with an integral aluminum handle for easy carrying. The protruding copper arms are available in three lengths—6, 12 and 18 in. Durable replaceable special alloy tips are available in an assortment of shapes for specific needs. Each unit has a silicon steel and copper transformer wound with burn-out-proof spun-glas insulated magnet wire, said to be an assurance of safe high heat conductivity. Available in either 220 or 110 volt units, each portable spot-welder is supplied with 10 ft. of cable. The unit weighs 23 lb.

WRITE FOR MORE INFORMATION

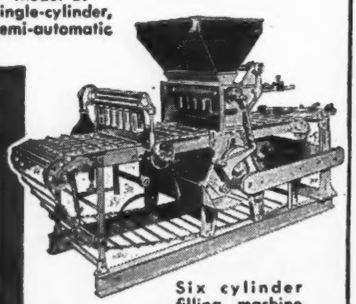
Food Industries Reader Service now makes it easy for you to follow up the news on new equipment and new materials. Tear-out coupon cards are supplied for your convenience on the special colored page which follows the equipment news section in this month's issue. Enter your requests, fill out and mail cards, and let Reader Service do the rest.

GEYER
SINCE 1914
"WE'VE PACKED THEM IN FOR YEARS"

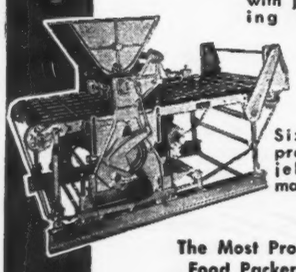


Fillers are straight line with multiple cylinders . . . designed for CLEAN CUT OFF FILLING for products that seek their own level . . . BOTTOM UP FILLING for semi-solids . . . No drip . . . Clean Filling . . . Entirely automatic . . . Readily adjustable to any size or shape container . . . Maximum production output.

Model B. Single-cylinder, semi-automatic



Six cylinder filling machine with jar cleaning device.

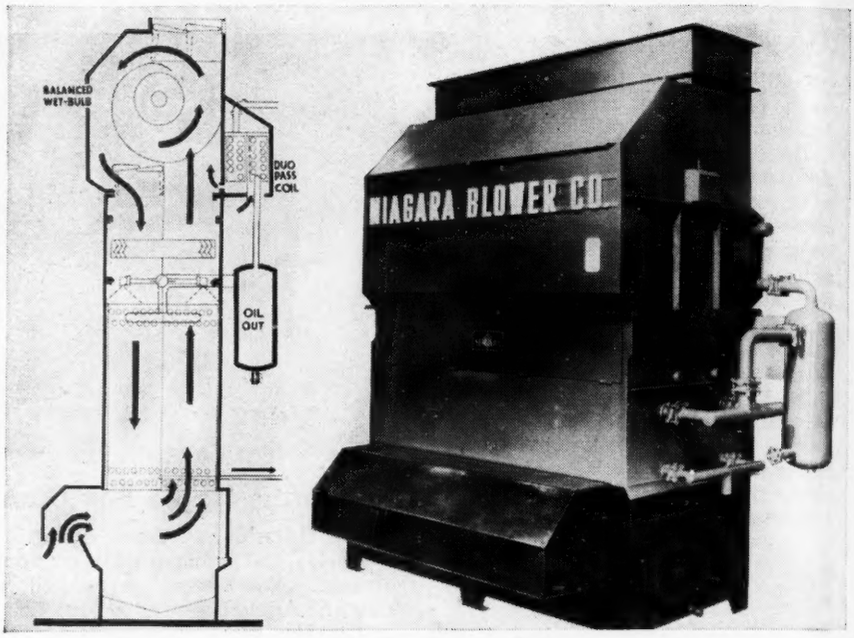


Six cylinder preserve and jelly filling machine.

The Most Prominent Food Packers Use Geyer Filling Machines

JAMS	LACQUER
SYRUP	MAYONNAISE
JELLIES	PEANUT BUTTER
CHEESE	APPLE BUTTER
GLUE	VANISHING CREAM
PASTE	MUSTARD AND
GREASE	SIMILAR PRODUCTS

THE FILLER MACHINE CO. INC
1248 E MONTGOMERY AVE PHILA PA

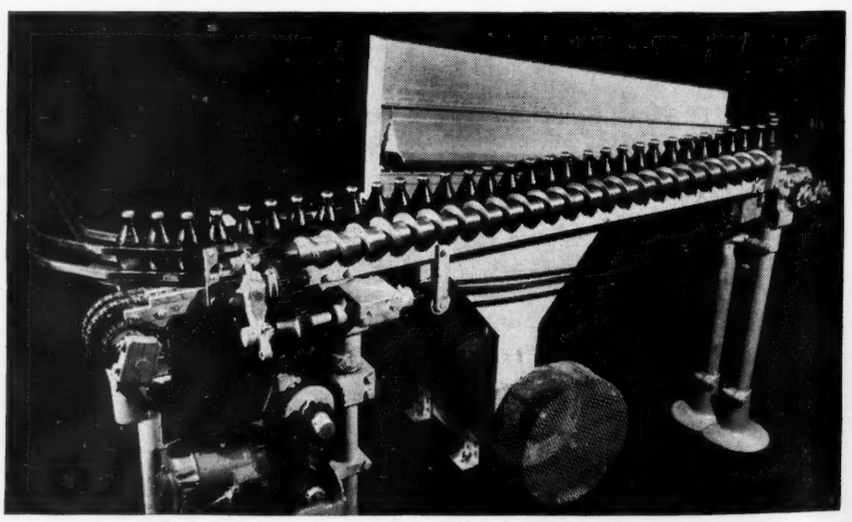


Aeropass Condenser—Improved Design 10

AN improved design of the Niagara Aeropass Condenser to condense refrigerant gases and provide trustworthy control for the year around operation of a refrigerating plant at a standard minimum compressor head pressure, automatically, has been announced by The Niagara Blower Company, Dept. I, New York 17, N. Y.

The condensing is done by passing the gas through two coils located in an air stream. First, the dry "Duo-Pass" coil, together with the "Oil-Out" takes out the super-heat and condenses and separates oil vapor from the refrigerant. Second, the wet coil condenses the gas at a low temperature. In this coil, thoroughly drenched by a water spray, 1000 Btu are removed for each pound of water evaporated. The spray water is recirculated and make-up is needed only for the small evaporation.

The purpose of the equipment is to remove the difficulties (and danger of inattention) in the manually operated control of compressors and condensers and also to insure the refrigeration plant owner always full capacity of his refrigeration system at all times. Unit saves considerable power cost in compressor operation by keeping head pressure at the minimum under all conditions. Units range from 10 to 100 tons rated capacity.



Continuous Automatic Container Drier 11

Now offered by Barry-Wehmiller Machinery Co., Dept. I, St. Louis, Mo., is a new B-W drier. This new machine is designed to reduce closure rusting, improve labeling, and produce a better looking container. It is slightly wider than conventional conveyor lines. As containers enter machine, they are rotated by a worm feed past a slanting air jet, from which a cutting blast of air removes moisture. Drier is a high-speed, completely automatic machine requiring no attendance. Various sizes of containers can be run through machine, which is approximately 8 ft. long and 1 ft. wide and is easily adapted into existing production lines. Photo shows unit with cover removed.

Coney Island 1890

Packages get out of date, too

Is your package smart and up to date? Is it styled to give your product 1948 sales appeal? And does it give good protection?

We'd like to show you what Patapar Vegetable Parchment can do for you. We'd like to show you how Patapar can be exquisitely printed with bright colors and appealing designs in the modern manner. We do the printing in our own plants, which are specially equipped for printing Patapar economically by letterpress or offset lithography, in one or more colors. Our art department will help you create a new wrapper design, with new life and sparkle.

Protection. With Patapar you get a wrapper that really will protect your product. Patapar has high wet-strength. It resists grease. It is pure of texture.

Make a note now to get in touch with Patapar.

Keymark

When you order printed Patapar you get the extra advantage of the Patapar Keymark. No extra cost. This nationally advertised symbol on your Patapar wrappers will remind people that your product is well protected.

Patapar REG. U. S. PAT. OFF.

Ideal for:

Butter wrappers	Deep freeze wraps
Ham boiler liners	Fish wrappers
Milk can gaskets	Cheese wrappers
Can liners	Vegetable wraps
Pie doilies	Sliced bacon wrappers

and hundreds of other uses

Paterson Parchment Paper Company • Bristol, Pennsylvania

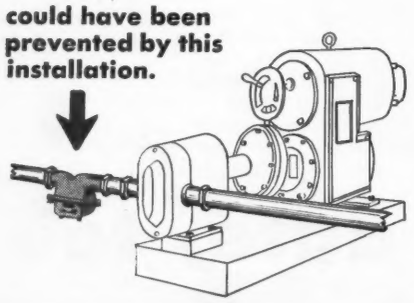
Headquarters for Vegetable Parchment Since 1885

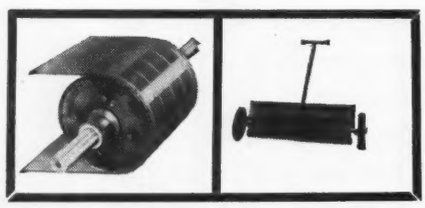
WEST COAST PLANT: 340 BRYANT STREET, SAN FRANCISCO 7, CALIFORNIA
BRANCH OFFICES: 120 BROADWAY, NEW YORK 5, N. Y. • 111 WEST WASHINGTON ST., CHICAGO 2, ILL.

This damage expense delay

was caused by this

could have been prevented by this installation.





Cesco Magnetic Pulley—a permanent magnetic separator for the removal of tramp iron from belt conveyed products.

Cesco Magnetic Sweeper—a permanent magnetic separator for picking up nails and other ferrous materials from floors, loading yards, docks and roads.

Manufactured by

CESCO

COLUMBIA ENGINEERING SERVICE CO.
San Francisco, California

COLUMBIA ENGINEERING SERVICE CO.
593 Market St., San Francisco 5, Calif.

Please send us literature on the following non-electric CESCO Sanitary Magnetic Equipment:

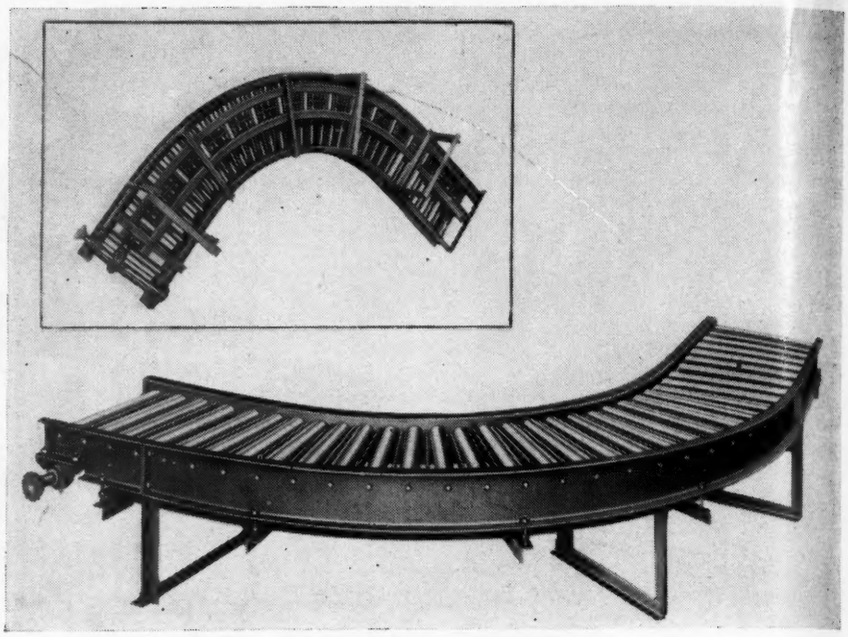
Magnetic Trap ..... ☐
Magnetic Plates ..... ☐
Magnetic Pulley ..... ☐
Magnetic Sweeper ..... ☐

NAME .....

ADDRESS .....

.....

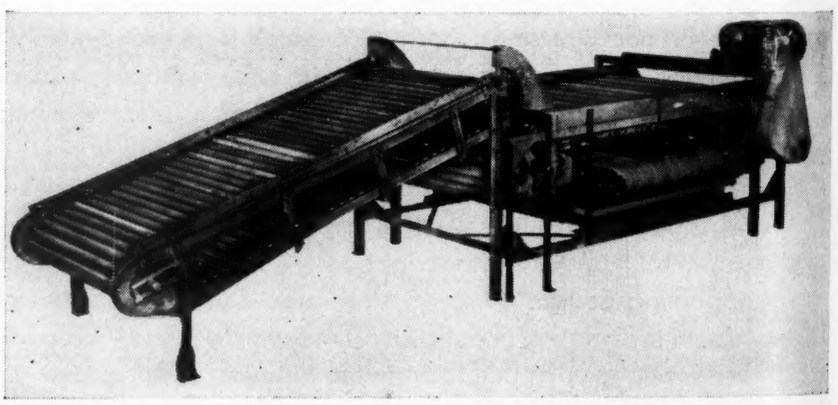
F-3



V-Belt Driven Live Roller Conveyor Curve 12

A V-belt driven live roller curve section has recently been perfected by The Alvey-Ferguson Company, Dept. I, Cincinnati 9, Ohio. These sections are now available for use with present conveyor installations. New, improved curves are driven either from an adjacent conveyor or an independent motor through chain or sprocket to a heavy-duty V-belt, which provides friction drive to lower side of load rollers.

V-belt rides in precision sheaves mounted to guide belt around arc of curve. These ball bearing sheaves are intermittently spaced below driving belt and are provided with vertical adjustment to maintain pressure against load rollers, assuring a practically positive drive. No damage will result if conveyor continues to run after line becomes blocked. Tension of V-belt is easily and quickly altered.



Size Grader for Spherical-Shaped Products 13

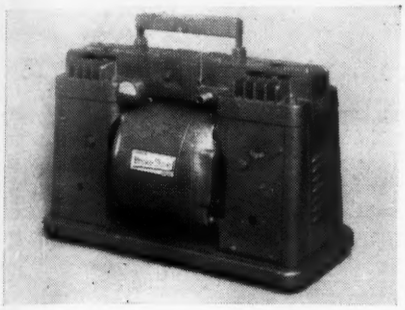
DESIGNED to simplify and improve the grading of spherical shaped products, such as peaches, oranges and grapefruit, new machine known as Tri-Roller Sizer is announced by Food Machinery Corp., Dept. I, San Jose, Cal. It is capable of grading the contents of 2,000 boxes (50-lb.) per hour into four sizes. Sturdily constructed of steel, sizer consists of a 20-deg. inclined roller elevator, drop roller sizer, rubber cross belt with grade separators, and a variable speed motor drive.

By means of the roller elevator, product is transferred gently to drop roller sizer portion of machine, where fruit is graded into one of four sizes. As grading takes place, product is delivered into a heavy, 3-ply rubber covered cross belt conveyor, which carries graded fruit from machine.

The sizer is essentially an endless roller conveyor constructed so that alternate rollers are fixed at each end to a conveyor chain. Intermediate or drop rollers contain a grooved wheel at each end. These wheels, in turn, ride on a step-like cam or track, and are held in position by vertical guides fastened to the conveyor chain. As grooved wheels ride down various steps on track, distance between idlers increases, creating dual spaces on each side of idler rollers so that a product of a given size, from 1¾ in. to 4 in. diam., will drop through those spaces corresponding to diameter of fruit. Receiving belt is equipped with steel dividers.

Air Compressors 14

TWO PORTABLE fractional hp. air compressors have been announced by American Brake Shoe Co.'s Kellogg Division, Dept. I, New York, N. Y. Both models produce 100 percent oil-free air. Special designing avoids contact or contamination of the air with lubricating oil. Both compressors are readily adjustable for different pressures. Model 17-C (shown with handle) delivers 4.4 cfm. free air at 40 lb. pressure. It is powered with a ½ hp.

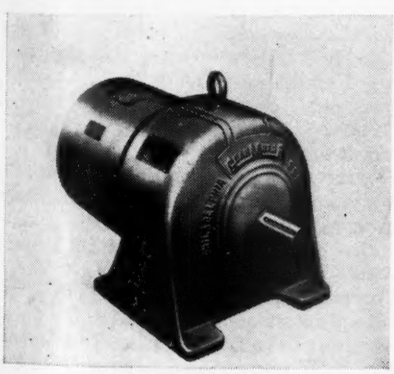


electric motor. New "lubricated for life" sealed ball bearings preclude dangers of burned-out bearings.

Model 8-C delivers 2.2 cfm. at 25 lb. pressure. It is powered with a ¼ hp. electric motor. Equipped with a single air cleaner, this model has no cylinders, pistons or rings to wear out. A force-feed oil system assures positive lubrication. Unit is mounted on sturdy steel base with rubber feet.

Gear Motor 15

A COMPACT, lightweight, helical-gear self-contained speed reducing unit, known as the Philadelphia-Reliance "GearMotoR" is announced by Philadelphia Gear Works, Inc., and Reliance Electric & Engineering Co., Dept. I, Philadelphia, Pa. These two firms have



recently pooled their designing and manufacturing facilities to produce this motor. Unit is available in single, double and triple reductions, and it provides a wide range of speeds with motor ratings from 1 to 60 hp. NEMA "D" type flange mounting permits use of any type enclosure in a.c. or d.c. motors. Each totally self-contained, motor and gear units are readily separated, and gears in the many reduction units may be inspected without uncoupling from driven machine. Hous-

We're proud of our new baby—and you're going to be just as enthusiastic, too. The newest GLOBE product—STITCHED CANVAS BELTING—is a husky youngster, already prepared to give you perfect performance on many of your elevating, conveying and transmission needs.

Backed by the GLOBE reputation STITCHED CANVAS BELTING manufacture and applications are under direct supervision of a man whose knowledge and experience in this field is outstanding. Inquiries are invited.

Other GLOBE products (for practically every need of industry) include:

KANRY-TEX: the superior belting for food processors.

SOLID WOVEN WHITE COTTON: "tops" for light conveying.

ENDLESS WOVEN: for grinders, drill presses, and other high speed tools.

CELLULOSE COATED: for bakery and candy manufacturers.

GLOBE line of Woven Beltings. Write for full particulars.

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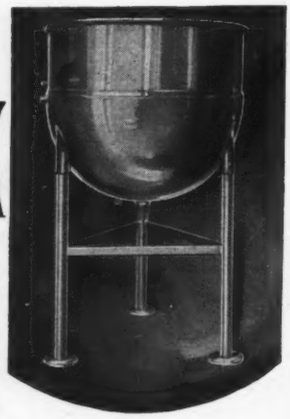
A NEW IDEA



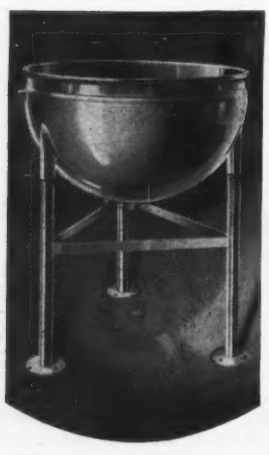
SANITARY SLEEVE VALVE

FOR ALL KETTLES MADE BY

HUBBERT

AN IMPROVED METHOD

of processing which keeps outlet tube free of all material thus eliminating repouring and assuring perfectly mixed batches of contents. A great saving in labor cost is effected and the continual watching of kettle is unnecessary.



SIZES 2-2½-3" OUTLET FITS ALL JACKET KETTLES & TANKS AND CAN BE USED ONLY WITH NEW KETTLES

Made of cold drawn stainless steel, highly polished, this valve is in accord with Hubbert quality and is designed for long wear and accurate operation. Valve openings lies close to the bottom of inner shell. Will shear off heavy and semi solids and large particles.

R. H. HUBBERT AND SON INC.
STAINLESS STEEL FABRICATORS

Makers of the world's finest seamless drawn stainless steel steam jacketed kettles

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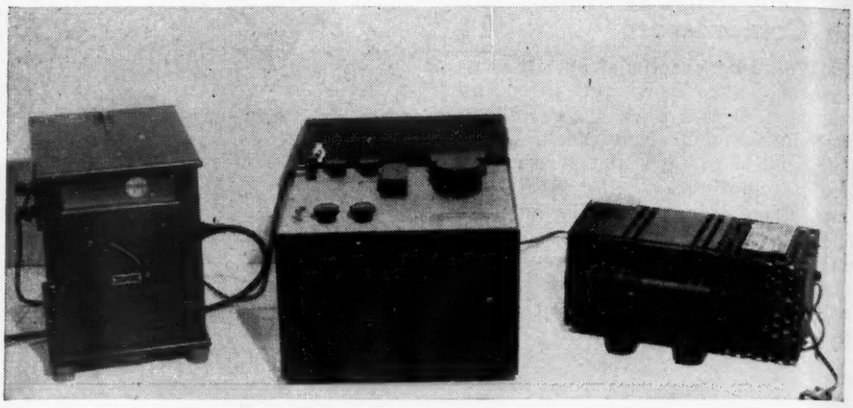
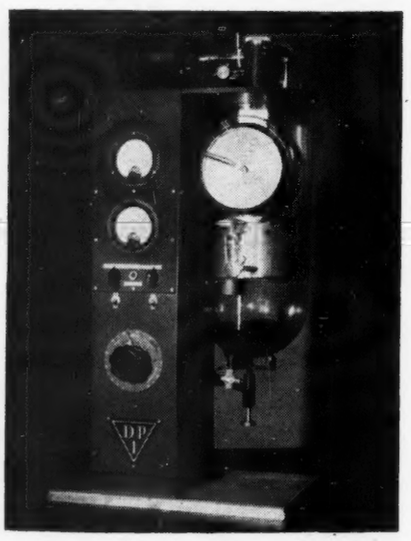


Photoelectric Fluorometer Instrument 16

A NEW photoelectric fluorometer having a wide range of sensitivity selection 100 to 1,000 times greater than similar instruments is announced by the Farrand Optical Co., N.Y.C. It has been developed and designed for use with either micro or macro volumes of solutions and is capable of measuring concentrations as low as one part per billion in volumes as small as ½ cc. of fluorescent substances. Instrument is particularly suitable for quantitative analysis of fluorescence of vitamins such as thiamine and riboflavin, also oils, organic and inorganic compounds, drugs and pharmaceuticals.

Molecular Still 17

UNIT for distilling fats, oils and waxes by molecular distillation at the laboratory bench has been made available by Distillation Products, Inc., Dept. I, Rochester, N. Y. Simple, compact, portable and inexpensive, new model, Type CMS-5, employs centrifugal evaporator embodying same principles as company's large commercial stills, so that laboratory results can be translated into terms of commercial production. Evaporator molecular still unit consists of a conical rotor of 5 in. dia., which is warmed by an embedded heater. Condenser is formed by a flattened surface of the bell-jar which encloses complete unit. Substance to be processed is contained in the bottom of the inverted jar, from where it is fed, by a small circulatory pump, onto center of rotor. Centrifugal force spreads it in an extremely thin, uniform layer across surface of rotor. Distillant is in contact with the heated evaporator for only 0.2 to 0.05 sec. The still occupies about 3 sq. ft. of bench space, and the mechanical pump an equal area. Meters and controls, mounted on a single panel, include a thermocouple dial, Pirani type vacuum gage and a variac to control temparture of evaporator.



Truck Refrigeration 18

A NEW, compact self-contained refrigerating system for trucks, which increases cargo payloads, reduces maintenance and affords constant cooling on the road plus a "plug-in" standby service during stop-overs, is announced by Frigidaire Div., G.M.C., Dept. I, Dayton, Ohio. It was developed by K. E. May, a Frigidaire commercial refrigeration dealer.

A small gasoline engine drives a 115-volt A.C. generating unit and powers a compact reciprocating-type Frigidaire compressor which in turn operates a forced-air coil to cool the cargo compartment. The entire system is enclosed in an insulated case in the front section of the truck trailer. The forced-air cooling unit is suspended from the ceiling. Users claim that maintenance work has been reduced to a minimum with the self-contained power unit in comparison with the conventional drive from the propeller shaft. In addition the system saves weight by eliminating bulky hold-over plate-type evaporators with eutectic solution, thus affording an increase in actual cargo payloads. Because the forced air evaporator operates at a high back pressure, a smaller compressor is possible, allowing even more weight reduction. While

the truck is on the road, refrigeration is supplied continuously as required by the gasoline generating unit, which operates the cooling unit with a governor when the compressor shuts off. Another feature is an arrangement which permits water, accumulated by defrosting, to drain into the radiator of the gasoline engine, keeping it filled and disposing of any excess.

During stop-overs, the truck operator can shut down the engine generator and operate the system by plugging in to any 115-volt electrical outlet. Two air vents are installed in either end of the insulated compartment. The installation has been designed so that the truck operator can start the gasoline engine from a pushbutton control in the driving compartment.

Motor Control Center 19

FOR PURPOSE of controlling any number of motors rated up to 200 hp. at 440v. from one central location, a new motor control center is announced by Control Div. of General Electric Co., Dept. I, Schenectady, N. Y. These centers are designed so that all connections can be made from the front thus permitting centers to be lined up against wall or in back-to-back fashion to conserve space. They consist of standard starter units which are slid

into vertical, cabinet-type sections in building block fashion. Sections are 90 in. high, 20 in. wide and but 12 in. deep. Starters are furnished in five different sizes, and each is a complete, fully-enclosed unit which can be arranged within vertical sections to suit requirements of user. There is a built-in circuit breaker for short-circuit protection. Breaker is interlocked so that doors of sections cannot be opened when power is on.

Hydraulic Pulp Press 20

DEVELOPMENT of a hydraulically operated discharge port pressure cone or "floating cone," designed to increase efficiency and to assure a more uniform product in the processing field; is reported by Jackson & Church Co., Dept. I, Saginaw, Mich. Floating cone is an automatic device for providing

Announcing

THE NEW | IMPROVED

PICK-ETS

FINDLEY'S EXCLUSIVE HOT PICK-UP CEMENT

Yes! PICK-ETS have been given new efficiency, new uniformity and economy. Because they are completely new in formula as well as in shape, PICK-ETS melt faster than ever, and remain tacky for longer periods of time. Pick-up is smoother, faster and more positive whether on tin, glass or fibre. PICK-ETS come ready to use and so easy to handle — just take out a handful, like marbles — or scoop out a canful . . . no chips or chunks, no waste powder.

Why not get the complete story on this faster, better performing adhesive — the newest, most streamlined advancement in the field of canning adhesives. Write for details and samples today. Patent Pending.

actual size

The new PICK-ETS are absolutely uniform, perfect spheres, each having exact maximum melting speed. Easier, cleaner to handle, available in GREEN for cold cans, RED for hot cans—AMBER for normal cans—fit the color to the temperature!

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INDUSTRIAL ADHESIVES exclusively

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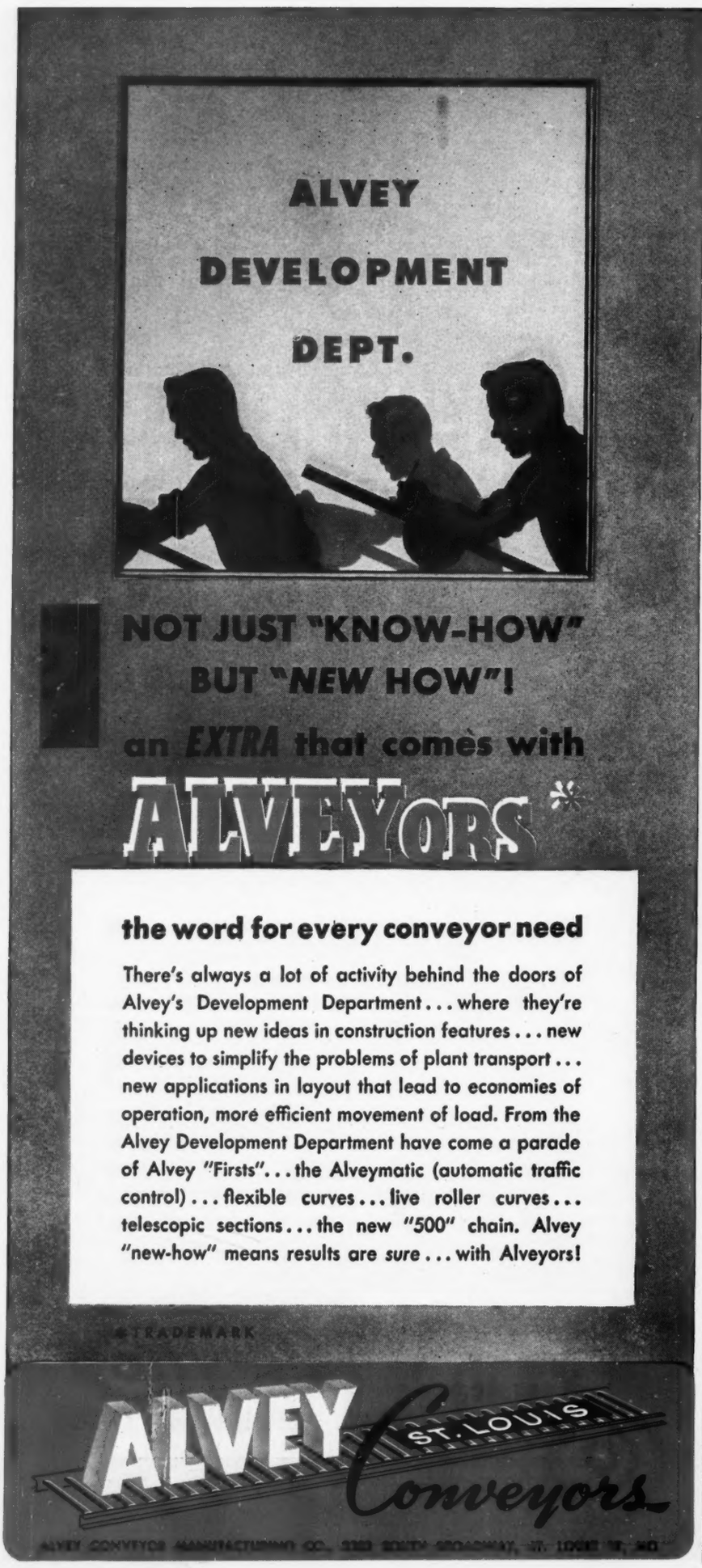
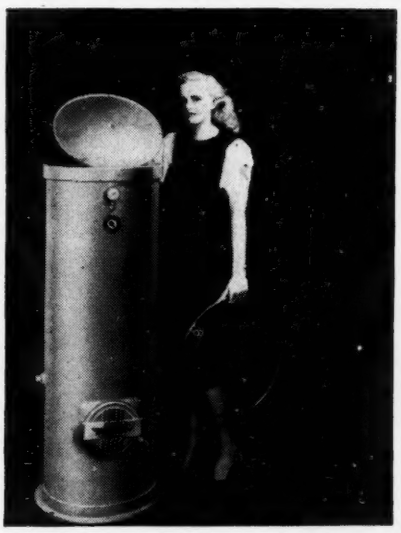

ALVEY
DEVELOPMENT
DEPT.
NOT JUST "KNOW-HOW"
BUT "NEW HOW"!
an EXTRA that comes with
ALVEYORS *
the word for every conveyor need
There's always a lot of activity behind the doors of Alvey's Development Department... where they're thinking up new ideas in construction features... new devices to simplify the problems of plant transport... new applications in layout that lead to economies of operation, more efficient movement of load. From the Alvey Development Department have come a parade of Alvey "Firsts"... the Alveymatic (automatic traffic control)... flexible curves... live roller curves... telescopic sections... the new "500" chain. Alvey "new-how" means results are sure... with Alveyors!
*TRADEMARK
ALVEY ST. LOUIS
Conveyors

constant pressure plus variable opening at pressed cake discharge port. New feature is stated to eliminate manual adjustment, to produce drier cake of uniform consistency, to maintain maximum pressure without loading up or minimum pressure without losing seal, and to give constant top-efficiency operation. Movable cone is connected to a sliding ring which floats on hydraulic jacks. Jacks are powered by a separate power and control unit equipped with a pressure control valve and gage, which is separate from press and may be located at any point convenient to operator.

Pressure Filters 21

MULTIPLE plate filter for pressure filtering of water, oil, fruit juice, wine, syrup, cider, and coolants is announced by Mercury Cleaning Systems, Inc., Dept. I, Chicago 6. Unit is rated at 1,000 gph. and can be used in multiple



or larger capacity. Instead of multiple handwheel arrangement for clamping lid, new filter employs a spring ring clamp, which tests at 120 psi. hydrostatic pressure. Clamp can be removed quickly, simplifying opening of filter for inspection. Cleanout port cover can be removed by a quarter turn of cover. No wrenches are required.

Industrial Truck 22

PROVIDING a one-tool solution to problem of handling skids of different heights, Yale & Towne Mfg. Co., Dept. I, Philadelphia, Pa., has designed a new model of its platform worksaver. Battery powered hand truck has a full 13-in. lift, in contrast with 2 or 3-in. lift generally found in platform models. Skids ranging from 6 to 8 in. in height can now be handled by the one truck. New modification aims to solve problem of manufacturer who receives from, and ships to, numerous customers and suppliers, each of whom may have a different type of skid, skid-rack or skid-bin. Truck has a capacity of 6,000 lb. and combines regular worksaver features of short turning radius, light weight, small size, and ease of maneuverability.

CATALOGS, BULLETINS

This digest of manufacturers' new publications is offered by FOOD INDUSTRIES Reader Service as a convenience for executives. The editors feature catalogs, data sheets and technical pamphlets likely to interest purchasing agents, superintendents, packaging men and food technologists.

Food Plant Equipment

Stainless Steel Tanks 51

Mojonnier Bros. Co.—Bulletin No. 146 illustrates full line of tanks featuring company's Cold-Wall unit. Includes flow-sheets and plant views showing numerous applications.

Ni-Hard Castings 52

The International Nickel Co., Inc.—8-page booklet presents facilities, specialities and locations of authorized producers of Ni-Hard, a nickel-chromium white alloy cast iron, called hardest commercial product of the iron foundry. Abrasion-problem questionnaire included with booklet enables casting user to supply sufficient information for a recommendation of suitable material for his service.

Bronze Rolled Sheet and Plate 53

Ampco Metal, Inc. — Bulletin 94, titled "Ampco Rolled Sheet and Plate," points out that centrifugally cast aluminum bronze results in a sheet that is sound, flaw-free and uniform throughout. Annealed sheet may be used in production of fabricated material; unannealed product may be employed in wear-resistant services. Bulletin contains table of physical properties, dimensions, weights, tolerances, and similar technical information.

Boiler Feed Units 54

Roy E. Roth Co.—6-page Bulletin No. 202 describes Roth Type X "Packaged" boiler feed units. Contains descriptions, detailed specifications, and prices on feed units, parts and accessories.

Flexible Couplings 55

Morse-Chain Co.—32-page Catalog C41-48 on Moreflex flexible coupling line. Covers development, construction and working principle of couplings, which are in a variety of capacities, ranging from the "Junior," with .06 hp. rating per 100 rpm., to double type having 13.80-hp. rating per 100 rpm.

Spray Drier 56

Swenson Evaporator Co.—4-page Bulletin D-104 gives flow sheets of spray-drying equipment employed in line for milk, flour, salt, and distillery byproducts, and lists other products to which this type equipment is applicable. Bulletin also describes services available.

Valves 57

The Clark Mfg. Co.—Pocket-size booklet on steam specialities, traps, pressure reducing and regulating valves.

Geared Motors 58

U. S. Electrical Motors—Multicolored 16-page bulletin. Comparative drawings show conventional motor construction in contrast to new U. S. Syncrogear motors, thus giving reader new conception of motor units for geared application. Describes advantages of using hardened gears and pinions to obtain greater wear resistance, also methods of attaining hardness. Power sizes range from ¼ to 30 hp., and standard AGMA speeds are available from 10 to 10,000 rpm.

Ball Valve 59

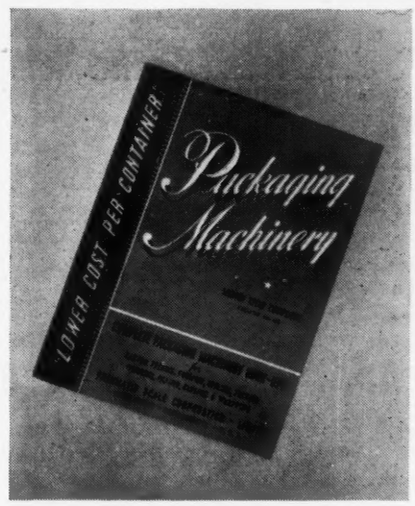
Kerotest Manufacturing Co.—4-page bulletin graphically describes new Kerosphere non-lubricated ball valve, for high and medium pressure service in food and chemical processing and related services. It is a completely new valve utilizing a spherical ball that absorbs thrust of line pressures on vertical trunnions and is sealed by seats which remain in constant contact with sphere. All working parts are of 12-14 chrome heat-treated stainless steel, and they conform with A.S.A. specification B 16e.

Candy Center Depositor 60

Harry L. Friend Co.—4-page bulletin describes and illustrates "Friend Bostonian" center depositor. Sizes, capacities and construction details given.

Packaging Equipment 61

Pneumatic Scale Corp., Ltd.—12-page Bulletin 106 contains descriptions and illustrations of various types of packaging machines. Specifications are given for range of carton sizes, speed of operation, floor space, motor drive,



weights and adjustability for size changes. Standard machine layouts are included for various production lines employing this equipment, complete from initial feeding of carton to delivery of finished carton.

Blowers and Exhausters 62

Roots-Connersville Blower Corp. — 4-page Bulletin G-82, in two colors, illustrates and briefly describes company's blowers and exhausters. Text gives capacity and pressure ranges of various sizes and types available, in both standard and special units, mentioning principal applications. A general listing covers applications as to specific use rather than industries.

Ball Bearings 63

New Departure Div., General Motors Corp.—20-page book, "Outline of Procedure in Bearing Application," is fifth in "Engineering Service" series. It gives an outline of principal steps required in developing a successful ball bearing mounting. Book should be helpful to many designers who are now called upon to make provisions for bearings in a variety of products.

Condensation Return Unit 64

The Deming Co.—2-page leaflet, describes vertical condensation return unit. Specifications are given, and sizes and capacities shown in table.

Chain Belts 65

The Chain Belt Co.—Bulletin 48-26 describes Rex pressed steel detachable chain. Specifications and price lists are given for plain and attachment chains, and photos are included. Information to aid in determining what sprockets are advisable for use with chain is also given.

Water Demineralizers 66

Barnstead Still & Sterilizer Co., Inc.—4-page booklet describes and illustrates demineralizing units. Tables give capacities for various waters, also dimensions and shipping weights. Methods of operation of equipment and approximate regenerative costs are covered.

Conveyor Chain 67

Black Chain Co., Div. of Black Industries—4-page bulletin describes and illustrates various types of conveyor chains. Included are details of construction and specifications.

Wire Cloth 68

The Cambridge Wire Cloth Co.—New 80-page catalog, "Cambridge Wire Cloth and Metallic Screen," contains up-to-the-minute information about wire cloth and screen. Standard weights, also gross list prices, are included.

Materials Handling

Hand Trucks 69

Rapids-Standard Co., Inc.—Single-page Bulletin WE-45W illustrates and describes line of Wheel-Ezy hand trucks. Photos show various uses of trucks in moving heavy loads. Specifications are listed.

Solid Frame Conveyors 70

Maguire Machinery Co.—4-page Bulletin W-214 on sanitary solid-frame power conveyors for square and round milk bottle cases. Details of construction are illustrated and described for both straight and curved sections.

Utility Truck 71

The Standard Casing Co., Inc.—Pocket folder describes company's newest model stainless steel seamless truck for meat packing and processing industry—"Stancase" Junior No. 9. Dimensions, capacity, and weight are given.

Spiral Conveyors 72

The Jeffrey Manufacturing Co.—48-page catalog No. 803 covers spiral conveyors. Tables give materials lists, average weights, capacity chart classification, type of conveyor to use, and factor for hp. formula. Component parts of conveyors are illustrated and described. All equipment listed conforms to new Industrial

HOW TO GET THIS LITERATURE

Food Industries Reader Service now supplies tear-out coupon cards for your convenience in requesting copies of these new publications from manufacturers. Use one or more of the cards on the colored sheet bound near this page. Fill out, tear out, mail out and the Reader Service staff will see that your requests reach the manufacturers.

When you check through Spraying Systems Spray Nozzle Catalog 22 (if you haven't a copy be sure to write for one) . . . you will find complete performance specifications for thousands of nozzle types and sizes. Like the precision-built VEEJET illustrated above, every Spraying Systems Spray Nozzle will provide a spray identical to its listed specification. As a result you can select nozzles to meet your established requirements exactly . . . to give maximum spraying efficiency and lower operating cost.

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Standard Dimensions. There are instructions for ordering, and prices are given.

Hand Trucks 73

The E. W. Buschman Co.—Bulletin No. 31 covers company's complete line of hand trucks, available in 24 different models.

Pneumatic Conveying Systems 74

Convair Corp.—8-page Bulletin No. 101. Layout drawings given for handling various materials, lumpy as well as fine, using air or inert gases through pipe system as carrier. Capacities and operating requirements given.

Single Stroke Lift Truck 75

Lyon-Raymond—Bulletin No. 211 describes and illustrates single-stroke lift truck offered in one standard capacity of 2500 lb. and in varying platform sizes and heights.

Control Equipment

Low-Level Eductor Condensers 76

Schutte and Koerting Co.—8-page Bulletin 5-B pictures and describes low-level eductor condensers which operate on jet principle and eliminate need for costly equipment. Only power consuming auxiliary necessary for operation is a centrifugal pump for delivering injection water. Functional drawings and photos show applications and operating characteristics. Colors and tones are used to illustrate flow and differentiate between exhaust steam, injection water and condenser discharges. Easy-to-read table gives maximum water consumption, steam capacities, connection sizes, dimensions and weights for numerous sizes available.

Flow Recorder 77

Brooks Rotameter Co.—Bulletin 2 covers electronic flow recording and flow recording-controlling rotameter. Installation diagrams are included, also engineering details and operations data.

Level Control 78

Photoswitch, Inc—Bulletin PF479 describes maintenance-free level control for electrically conductive liquids, such as water, milk and beer. Complete specifications on equipment are given.

Scientific Instruments 79

American Instrument Co., Inc.—274-page Catalog 48 covers numerous scientific instruments for use in chemical, biological, physical, metallurgical, engineering and materials testing laboratories. Well illustrated, it includes comprehensive data on general laboratory equipment.

Laboratory Equipment 80

Eberbach & Son Co.—New bulletin shows line of redesigned metallographic polishing machines for laboratories. Equipment is described and price list given.

Plant Supplies

Chain-Lubricating Device 81

Oakite Products, Inc.—8-page pocket-size booklet on a new device which automatically dispenses lubricant films on bottle, can, or case conveyor chains, helps assure smooth, even operation of conveyors in dairies, ice cream plants, beverage plants, breweries, and other food plants. Booklet states this recently developed unit, known as Oakite chain lubricator, offers following advantages in connection with conveyor chain lubrication: More adequate control of lubricant solution concentrations; elimination of need for making up stock solutions; reduction in amount of material supply maintenance required; and assured, well-controlled flow of lubricant on conveyor chain surfaces.

Benzene Hexachloride 82

Pennsylvania Salt Manufacturing Co.—8-page booklet describing Penco BHC, technical grade benzene hexachloride containing 36 percent gamma isomer. It gives directions for proper use of products for insect control, also includes dust and spray dilution tables showing amounts of preparations needed to obtain desired gamma isomer content.

Liquefied Gas Flasks 83

Hofman Laboratories, Inc.—4-page bulletin describes and illustrates containers and flasks for liquefied gases. Capacities and construction details are given.

Welded Floats 84

W. H. Nicholson & Co.—8-page Bulletin 348 features welded floats of stainless steel, Monel and chrome plated steel, in spherical, elliptical and cylindrical shapes, with weights, buoyancies, and collapsing pressures, as well as other useful information. Price list is given.

Hose Fittings 85

The B. F. Goodrich Co.—Catalog Section 3100 on fittings for diversified lines of hose which company manufactures. Featured are recommendations for attaching couplings to hose, and a table is carried showing various couplings recommended for different types of hose. Each fitting is pictured and described, and sizes available are listed.

Multi-Cord Belting 86

The B. F. Goodrich Co.—Catalog Section 2140 covers company's multicord belting, recommended for severest drives—i.e., installations where heavy loads, high speeds, small pulleys and limited takeup impose tremendous strain on belt. Construction is pictured and described, advantages cited, and data outlined.

Miscellaneous

Unit Substations 87

Allis-Chalmers—15-page Bulletin 11B 6935 describes construction details of three transformer types—oil-filled, "Chlorextol" liquid-filled, and dry type. Also described are construction highlights of load ratio equipment and metal-clad switchgear. Units are available with magnetic air blast and oil circuit breakers.

Masonry Waterproofing 88

Stonhard Co.—Folder gives complete information on sealing water-seepage or leaks in virtually every type of masonry construction.

Rubber-Coat Floor Paint 89

The Wilbur & Williams Co.—2-page leaflet describes rubber-coat skid-less floor enamel. Uses and characteristics are given, and available colors are illustrated.

Transparent Waterproofing 90

Ranetite Manufacturing Co., Inc.—Pocket-size leaflet on improvement of Ranetite No. V Transparent Waterproofing formula, employed for outside walls, brick, stone, stucco and kindred surfaces.

Cooling Towers 91

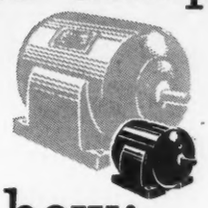
Binks Manufacturing Co.—Technical Bulletins 36 and 37 on Type 2K-S (spray-filled) and Type 2K-W (wood-filled) mechanical draft cooling towers. First bulletin describes design changes to increase ease of assembly, step up operating efficiency and improve appearance of Type 2K-S induced draft cooling tower—supplied in 20 standard frame sizes, with capacities from 150 to 645 gpm. Second bulletin covers Type 2K-W induced draft cooling tower—used in many industries for various water cooling operations in refrigeration, air conditioning, and manufacturing, also allied applications where interior decking is needed for distribution and breakup of water. Supplied in 20 standard sizes, capacities ranging from 150 to 495 gpm.

Storage Battery Research 92

Gould Storage Battery Corp.—16-page illustrative booklet, "Better Batteries for Industry Through Research." It is available to all who are interested in d.c. electrical supplies for materials handling, communications, switchgear operations, and general industrial purposes.

AC Arc Welder 93

Electric Arc, Inc.—Catalog sheet contains specifications and data on company's new development—the Nu-Arc general purpose AC arc welder. It is described as an innovation in welding machine design. Moving parts are reported eliminated to increase operating efficiency.

. . . proper lubrication of conveyor chains with Oakite Composition No. 6 cuts  power costs read how:

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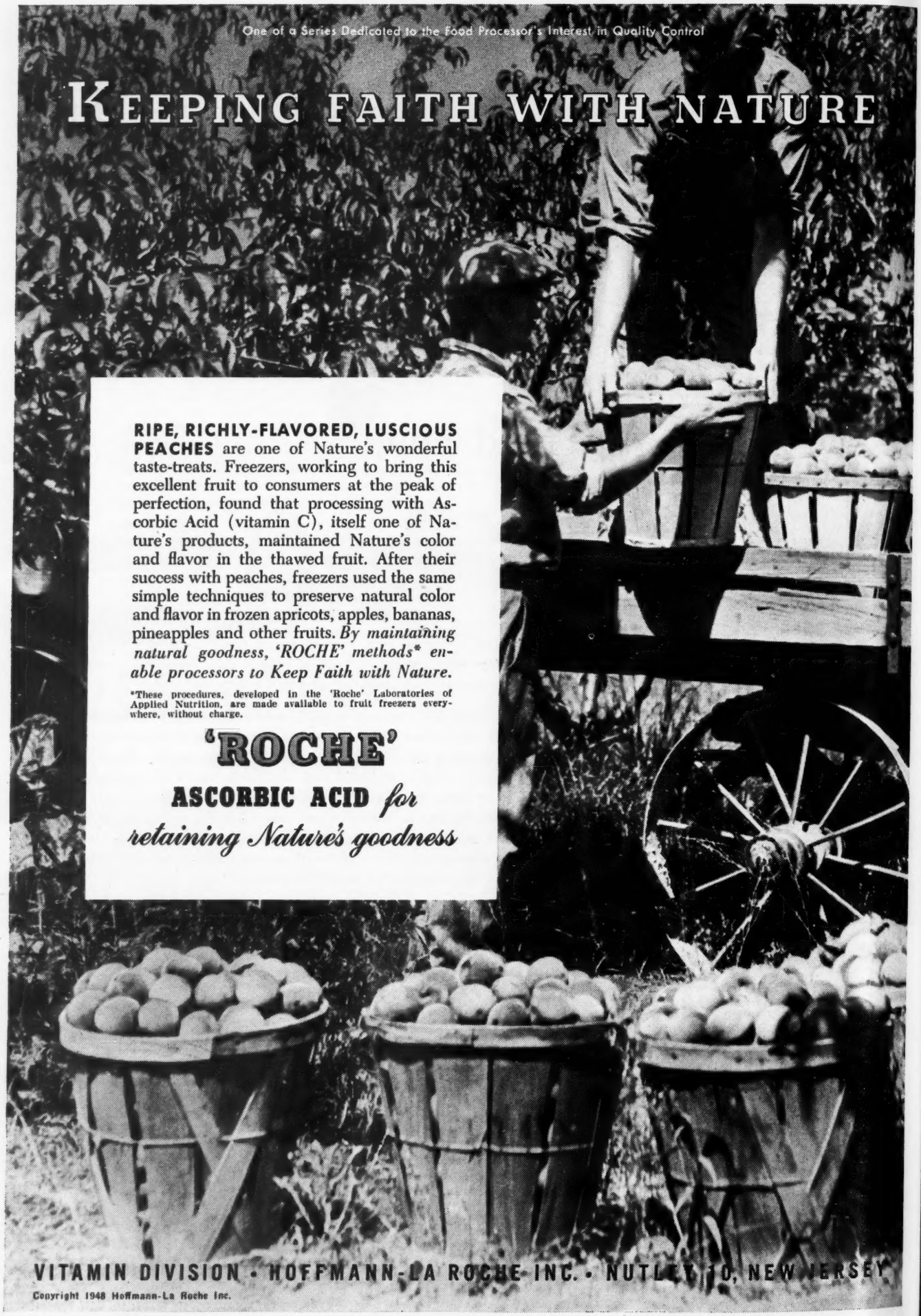

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FOOD TECHNOLOGY
NEW DISCOVERIES AND INVENTIONS

BAKING

Milk Powder in Bread

ADDITION of skim milk powder to bread dough, common in the United States, is not customary in Australia. Hence, tests were made in the latter country, incorporating typical Australian skim milk powders in test doughs on a 6 percent dry basis. The results were unsatisfactory, as were those in similar tests with United States skim milk powders known to yield good results in this country. Attempts to improve results by heat treatment of the powder and increasing its acidity were not encouraging, nor did the use of hard wheat flour improve the quality of the bread. It was not until fat was added to the dough that a satisfactory loaf was produced, and the best results were obtained when that ingredient was introduced as an emulsion with the milk powder. Test bakes were also made with interface modifying ingredients and with whole egg and egg albumen substitutes without beneficial results. After testing several fats in different percentages it was concluded that satisfactory results could be obtained with a powder containing 20 percent fat, and that the most desirable amount of powder to add to bread was 12.5 percent. Large-scale baking tests confirmed this laboratory result.

Digest from "The Addition of Skim Milk Powder to Australian Bread," by R. C. Hutchinson, H. E. West and J. T. Jeffreys, **Journal of the Council for Scientific and Industrial Research**, vol. 20, no. 4, November, 1947.

MEATS

Saltiness of Bacon

WILTSHIRE type bacon increases in saltiness during storage at 30 deg. F. when determined by taste tests. Its vitamin content is also effected by curing and storage. Time of storage effects the chloride and nitrate content, but the moisture content is unaffected. In testing meats for salt content, water extraction is preferable to ashing. There is no evidence that chloride or moisture diffuses from fat to lean parts of bacon during storage. Evidence was obtained that chloride is fixed in freshly cured muscle-tissue and liberated later by enzyme action. This explains why cured pork appears to increase in saltiness during storage.

The fresh pork used in the trials contained 66 mcg. thiamine, 6 mcg. riboflavin and 220 mcg. niacin per g. dry weight. Curing caused significant losses of thiamine and niacin. Storage for 24 days at 30 deg. F. resulted in appreciable losses of thiamine and riboflavin but not niacin. Loss of thiamine and niacin during curing suggests that these vitamins leach into the pickle while riboflavin does not. There is no definite relation between vitamin content and chloride or nitrate content although the best retention of riboflavin and niacin after cooking was found in bacon of low chlorine content.

Digest from "Canadian Wiltshire Bacon XXVIII. Chloride Shift in Cured Pork" by G. A. Grant and N. E. Gibbons, and "XXIX. Changes in Thiamine, Riboflavin and Niacin Contents Produced by Curing, Storage and Cooking," by P. R. Gorham, **Canadian Journal of Research**, vol. 26F, 1-13, January, 1948.

DEHYDRATION

Dried Fruit Juice

NON-HYGROSCOPIC dried fruit juice, which retains to a large extent the flavor, aroma and vitamins of the natural juice, is the object of a recent invention. The invention comprises admixing a calcium-bearing phytate in a fruit juice containing an organic acid, and dehydrating the liquid so formed into a dry, water-soluble product. Proportions of phytate and acid of the juice should be approximately equal.

Digest from U. S. Patent 2,437,104, issued March 2, 1948, on an application dated Sept. 4, 1943, to Royal Lee, Milwaukee, Wis., and assigned to Lee Foundation for Nutritional Research, Milwaukee.

Redeterioration In Dried Egg Albumen

SYSTEMATIC studies have been made of the variables known to influence the rate of color and fluorescence development, and solubility loss in dried albumen. It had already been established that low moisture, pH, and storage temperature were beneficial in preventing deterioration; but the chemical reactions responsible for storage changes in dried egg products were not clear, although it had been shown that certain changes in color and solubility were related to the presence of free glucose in albumen.

Measurement of fluorescence and optical density in deteriorating egg albumen indicated a linear relation between these two characteristics; and since measurement of fluorescence is more sensitive and easier to use, the data in this report are based on measurements of this characteristic of deterioration. It is assumed that changes in fluorescence are paralleled by changes in color.

Using both natural and glucose-free albumen, storage studies were made over a wide range of temperature to determine the effect of that factor on fluorescence and solubility. Temperature coefficients for the reactions involved in fluorescence development and solubility loss are very high. Above 86 deg. F. fluorescence reaches a maximum and then declines, the decline paralleling development of insolubility.

Acidification decreased the rate of solubility changes, the greatest decrease resulting from a change from pH 9.5 to 9.0, with little effect on fluorescence. At pH 4.8 fluorescence and insolubility development were both delayed. At moisture contents below 2 percent the rate of deterioration was slow, but variations in moisture content produced greater

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effects than those in pH. Glucose concentration exerted a powerful effect on rate of deterioration. Concentrations of 0.02 percent and higher caused appreciable changes in color and fluorescence, and concentrations of 0.05 percent and above caused measurable changes in solubility. Other unknown factors are believed to affect the rate of deterioration.

Further study of the glucose-protein reaction was made by the same authors. Since the removal of glucose completely inhibits deterioration, it seemed certain that reactions between glucose and egg white protein were responsible for changes noticed during storage. The following sequence of reactions is postulated to explain the various evidences of deterioration. First, glucose reacts with egg protein, forming simple glucosides with the amino and other nitrogen groups. Subsequent reactions occur, one of which causes fluorescence and the other insolubility, the former being more rapid. When insolubility develops, fluorescence values decrease because the fluorescent materials are attached to the protein, and when the latter insolubilizes they are no longer extractable. Fluorescent and color reactions continue in the insoluble fraction, however, as shown by progressive darkening in long storage.

Effect of Amino Acids

In studying the effect of adding amino acids it was found that all the acids tested exerted a powerful effect in retaining the solubility of dried albumen. But, with the exception of cysteine, they also greatly accelerated the development of color and fluorescence. The results indicated that glucose reacts more rapidly with amino acids than with egg proteins, leading to color and fluorescence but not to insolubility.

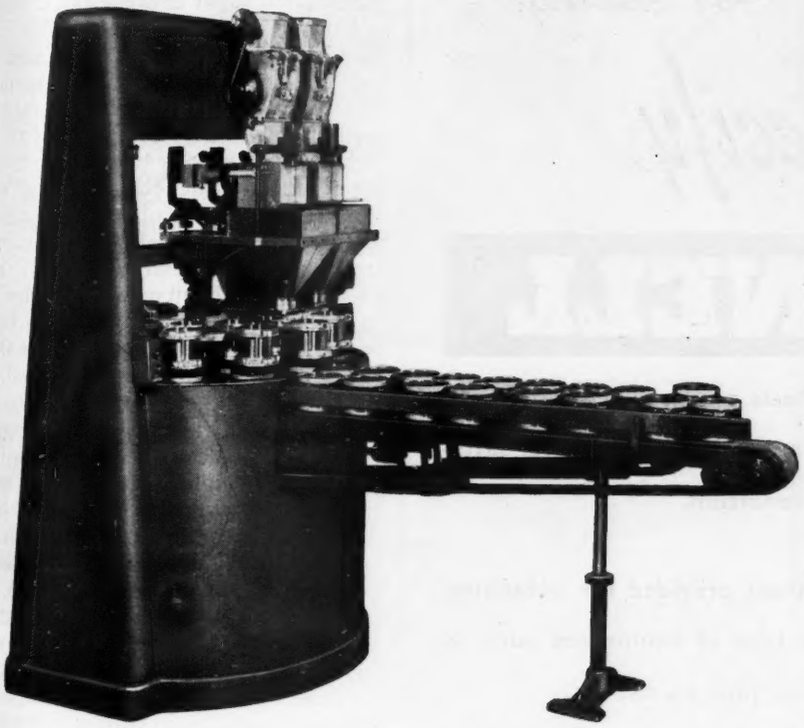
Investigating the chance that hydroxymethylfurfural (HMF) might be an intermediate in the insolubilization of dried albumen during storage, the conclusion was reached that HMF can not be wholly responsible for the changes observed, and that the development of fluorescence in particular must be otherwise accounted for.

Replacing glucose by other sugars, the results indicated that only those sugars containing the free aldehyde group will react with egg proteins to cause deterioration.

Digest from "Factors Influencing Rate of Deterioration in Dried Egg Albumen," and "Glucose-Protein Reaction in Dried Egg Albumen," by G. F. Stewart and R. W. Kline, *Industrial and Engineering Chemistry*, vol. 40, 916-19, 919-22, May, 1948.

(*Continued on page* 184)

What's new in packaging machinery?



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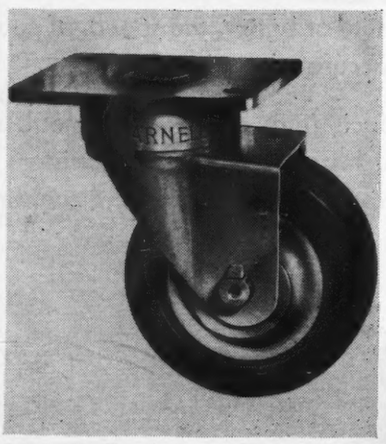

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QUALITY CONTROL

Quality of Frozen Eggs

REDUCING sugar content as an overall index of frozen egg quality depends upon the nature of the bacterial flora present. It may be adequate for eggs broken under laboratory conditions. Commercially frozen eggs are likely to require a combination of bacterial, chemical and organoleptic tests to obtain the proper picture of their quality. When correlation of bacterial count with reducing sugar content was attempted, a majority of the samples with bacterial counts below a million per ml., were below 300 mgm. percent reducing sugar, the minimum level suggested for Grade A frozen eggs. Likewise a considerable number with very high counts were well above the 300 mg. percent level and would have been judged Grade A in sugar content alone.

Similar results were obtained on frozen yolks and frozen whites. Whether reducing sugar is or is not a reliable index of quality, depends on the nature of the bacterial flora present, and this in turn is related to the quality of the eggs and the conditions under which they are broken in preparing the melange.

Digest from "The Reducing Sugar Content of Frozen Egg as an Index of the Bacterial Content", by C. K. Johns, Canadian Journal of Research, vol. 26 F. 18-23, January, 1948.

DAIRY

Milk Lipase in Cheese

STABILITY and pH activity characteristics of milk lipase are such that it can play no continuing role in the ripening of Cheddar cheese after making. In order to obtain direct substantiation of this conclusion, milk lipase estimations were made before, after and during the making and ripening of raw milk Cheddar cheese. A rapid rise in the milk lipase content results upon addition of the rennet. It quickly disappears, however, during heating and holding of the coagulum, and during removal of the whey. Only a small amount of milk lipase remains in the cheese curd after milling, and no activity can be found in green cheese 24 hr. after the start of making.

After 5-20 days, lipases which are considered bacterial, begin to make their appearance in the young Cheddar cheese. These lipases are believed to be in part responsible for the more rapid flavor development

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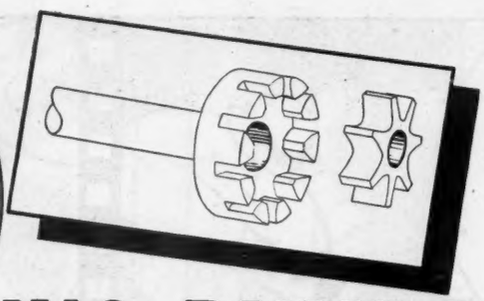

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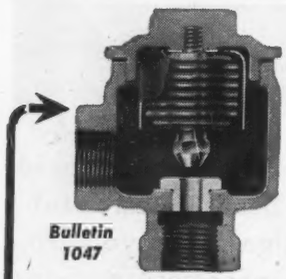
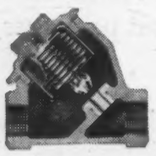
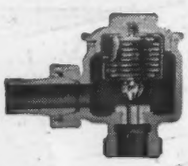


Bulletin 1047





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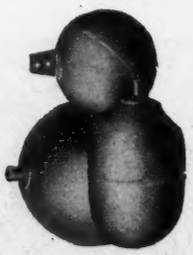

W. H. NICHOLSON & CO. 193 OREGON STREET WILKES-BARRE, PA.

in raw milk than in pasteurized milk cheeses.

Digest from "Lipase Activity During Making and Ripening of Cheddar Cheese," by M. H. Peterson, M. J. Johnson and W. V. Price, *Journal of Dairy Science*, 31, no. 1, 39-45, January, 1948.

Condensed Milk Viscosity

VISCOSITY of sweetened condensed milk increases logarithmetically with increase in storage temperature and arithmetically with increase in storage time.

Experiments were conducted with sweetened condensed milk in 2-oz. cans and in wooden barrels. By means of accelerated tests on the canned milk, the viscosity was increased from 132-1,155 poises in 170 days storage at the equivalent of 89 deg. F. At this viscosity a soft gel had formed. Milks stored at 0 deg. F. for several months showed no important physical changes. The tests indicated that sweetened condensed milk, packed in barrels, remains fluid a little longer than that packed in cans, when both are stored under the same conditions.

Digest from "The Effect of Conditions of Storage on the Viscosity of Sweetened Condensed Milk," by B. H. Webb and C. F. Hufnagel, *Journal of Dairy Science*, 31, no. 1, 21-30, January, 1948.

MICROBIOLOGY

Microbial Spoilage Of Vegetables

ASPARAGUS has been shown to be a poor medium for the growth of *Clostridium botulinum*, although it is readily attacked by other organisms. Believing that this immunity might be due to the flavonol compound rutin, which occurs plentifully in asparagus, tests were made to determine its action, as well as that of quercetin and quercitrin, on *Cl. botulinum*. Three sets of flasks, each containing 15 g. of green peas and 15 ml. of corn steep-casein medium, were inoculated with a mixture of 1,000 detoxified spores of *Cl. botulinum*, types A and B, per flask. One flask in each set was untreated as control. Weighed amounts of each of the three organisms were added to give concentrations ranging from 60 to 160 ppm. After incubation, sterile filtrates were prepared and tested for toxin by inoculating mice with 0.20 ml.

Rutin in concentrations up to 1,000 ppm. did not prevent growth of *Cl. botulinum* or interfere with toxin production. Quercitrin was effective only in concentrations up to

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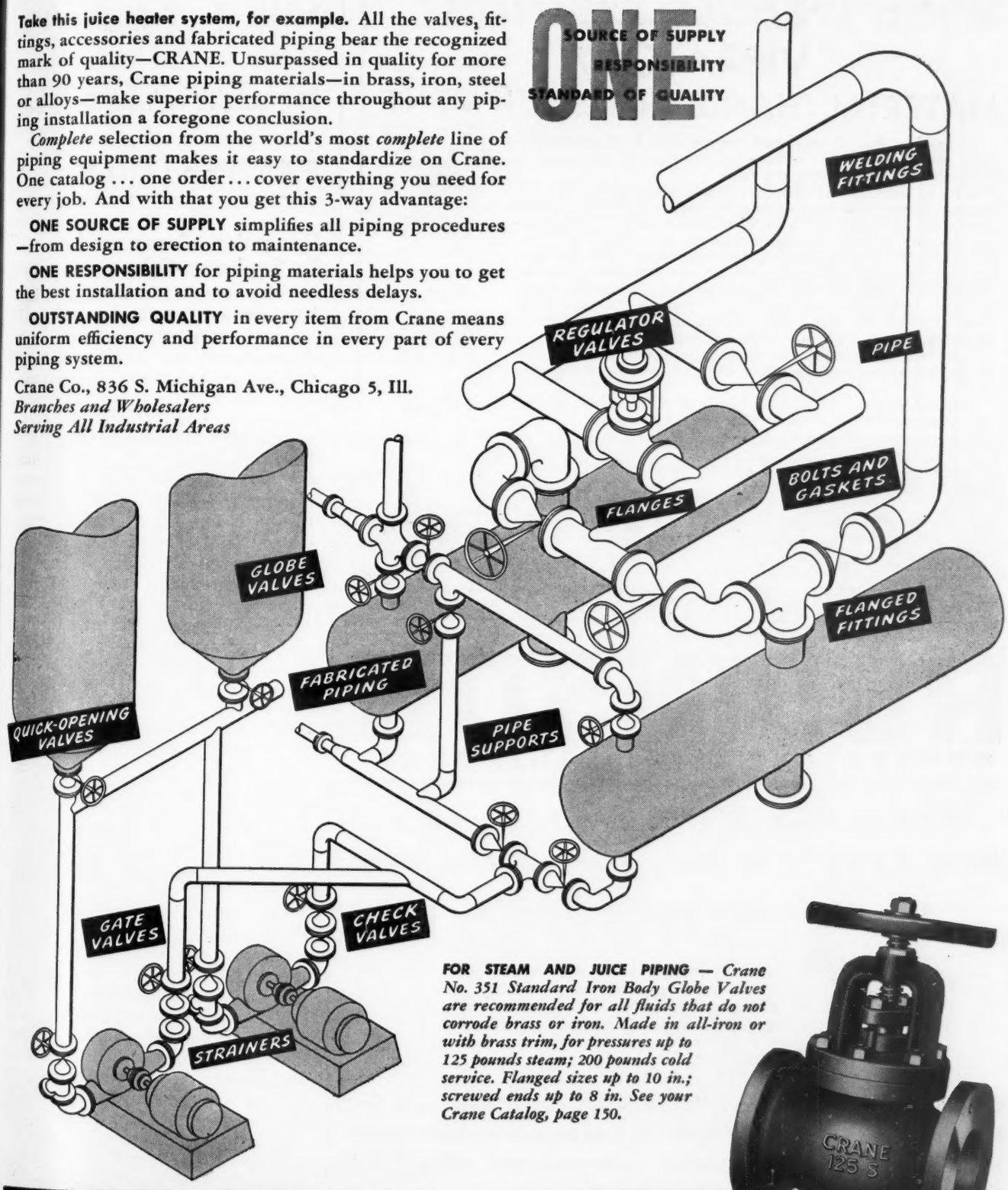

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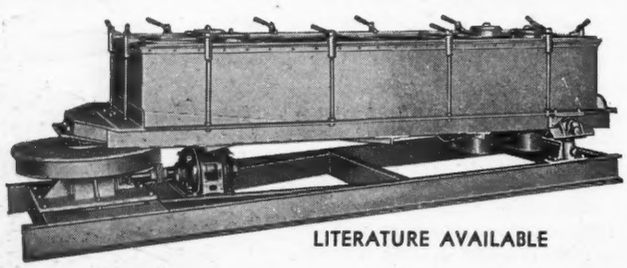

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1,000 ppm. Quercetin, however, in amounts of 80 to 160 ppm. had a marked effect and prevented toxicity in the course of several trials. On the other hand, in concentrations as high as 1,000 ppm., quercetin failed to inactivate preformed toxin of *Cl. botulinum* in 72 hours.

Digest from "Effect of Flavonols on *Clostridium botulinum*," by A. A. Andersen and J. A. Berry, *Science*, vol. 106, 644-45, Dec. 26, 1947.

FATS and OILS

Reversion Compounds In Soybean Oil

FLAVOR reversion in soybean oil has been attributed to the presence of several compounds, among them linolenic acid and lecithin, but no satisfactory hypothesis has been advanced to explain the development of off-flavors and odors. The present investigation was based on the known fact that steam deodorization will produce an oil that is entirely bland. Accordingly, the first step was to isolate the "reversion compounds" from reverted oil by steam deodorization in vacuum. The condensate from this operation was extracted with ether. Finally, the ether-soluble fraction was further subjected to high-vacuum distillation at room temperature for the recovery of a volatile portion in a dry-ice condenser.

When the ether-soluble fraction of the total condensate was remixed with the deodorized oil, the reconstituted product had the typical fishy or painty flavor of heat-reverted soybean oil. The same result was obtained with the condensate of the volatile portion of the ether-soluble fraction.

Qualitative tests on the volatile fraction showed the presence of carbonyl compounds, which were separated from the non-carbonyl portion by Girard reagent-T. The carbonyl portion had a flavor similar to that of reverted soybean oil. Two distinct 2,4-dinitrophenylhydrazones were isolated from the carbonyl portion of both hardened and unhardened soybean oils, the structure of which closely corresponds to that of α-heptenal. It appears, therefore, that α-heptenal may be one of the flavor components of reverted soybean oil, although the fact is not definitely established. A suggested precursor of α-heptenal in soybean oil is a conjugated triene of the oleostearic type with double bond conjugation in the 9,10; 11,12; and 13,14 positions. Oxidation at

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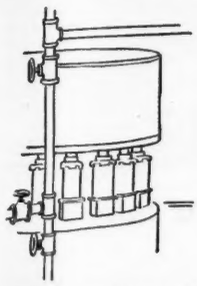

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Let Globe Steel Tubes Co. assist you in surveying your tubing needs and you are assured of an outstandingly dependable source for steel tubing of all kinds: Stainless, Mechanical, Alloy Steel and Pressure . . . a wide range of sizes and types to meet your requirements . . . plus the engineering and research facilities to solve your tubing problems.

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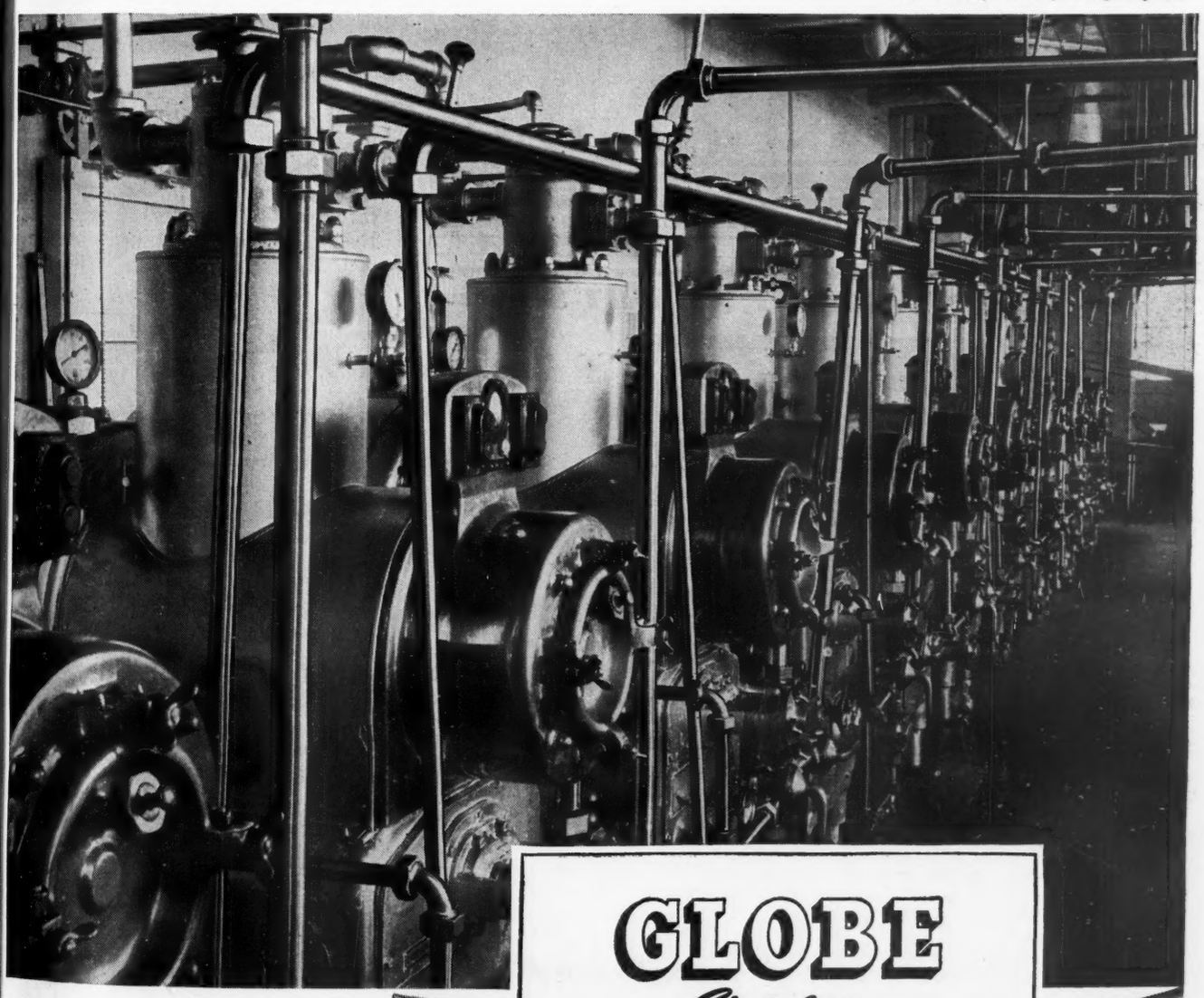
Photo Courtesy Creamery Package Mfg. Co.



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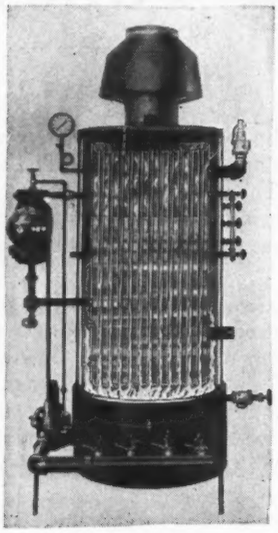

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the 11,12 position could produce *a*-heptenal. The bond structure necessary for such a reaction may result from the isomerization of linolenic acid.

Digest from "Flavor Reversion in Soybean Oil. IV. Isolation of Reversion Compounds in Soybean Oil," by C. J. Martin, A. I. Schepartz and B. F. Daubert, *The Journal of the American Oil Chemists' Society*, vol. 25, 113-17, April, 1948.

FREEZING

Concentrating Juice By Freezing

FRUIT JUICE, concentrated without loss of vitamins or flavors, by passing through successive freezing stations at successively lower temperatures, is the object of a recently patented process. In operation, the juice is pre-cooled and deaerated then passed through not less than 3 successive freezers, each maintained in successively colder condition. As an example, the temperatures of the three freezers may be: 18 deg., 10 deg. and 0 deg. F. Ice from the freezers is conveyed to a centrifuge. In the centrifuge, the more dense portions are thrown out against the wall and pumped back to pass through one or more of the freezers. By this method fruit juices may be concentrated to about 44 percent solids it is claimed.

Digest from U. S. Patent 2,436,218, issued Feb. 17, 1948. on an application dated Sept. 12, 1944, to W. E. Malcolm, Orlando, Fla.

MISCELLANEOUS

Molasses From Wood Waste

MOLASSES, that is suitable as a substitute for blackstrap molasses for stock feed and glucose for many industrial uses, can be made from wood waste by a process recently developed at the U. S. Forest Products Laboratory. The process consists of converting wood waste to sugar by pressure-cooking with dilute acid and subsequently evaporating the resulting sugar solution to molasses. Yields from 150-190 gal. of molasses per ton of wood are indicated, depending upon the amount of cellulose in the wood material.

The value of the molasses for various purposes will vary somewhat as a result of the wood used. That produced from soft wood will contain hexoses, the principal one being glucose. This molasses is most valuable for alcoholic fermentation, where only the hexoses are used, and for feed for swine, horses and

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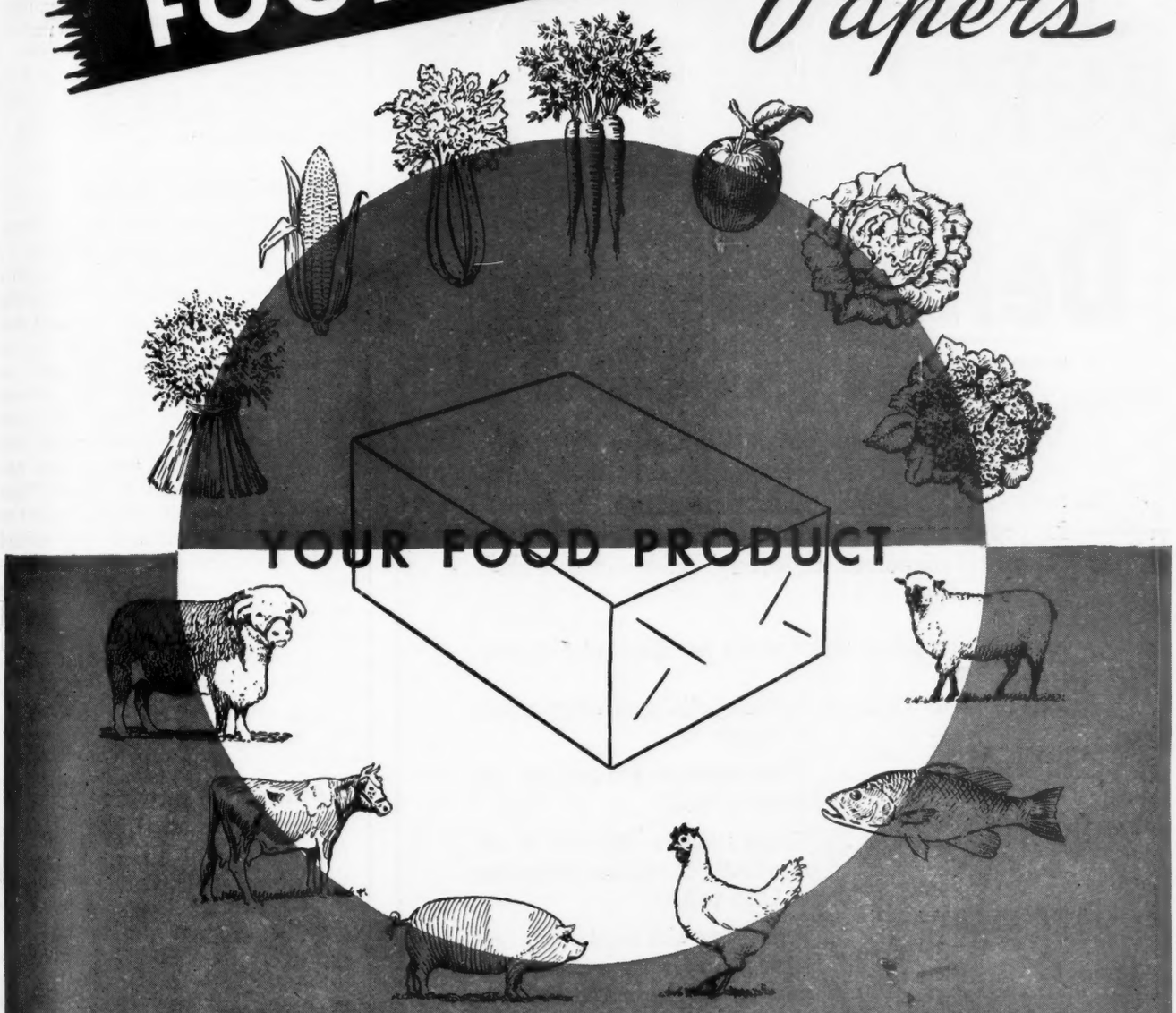
FOOD PROTECTION *Papers*



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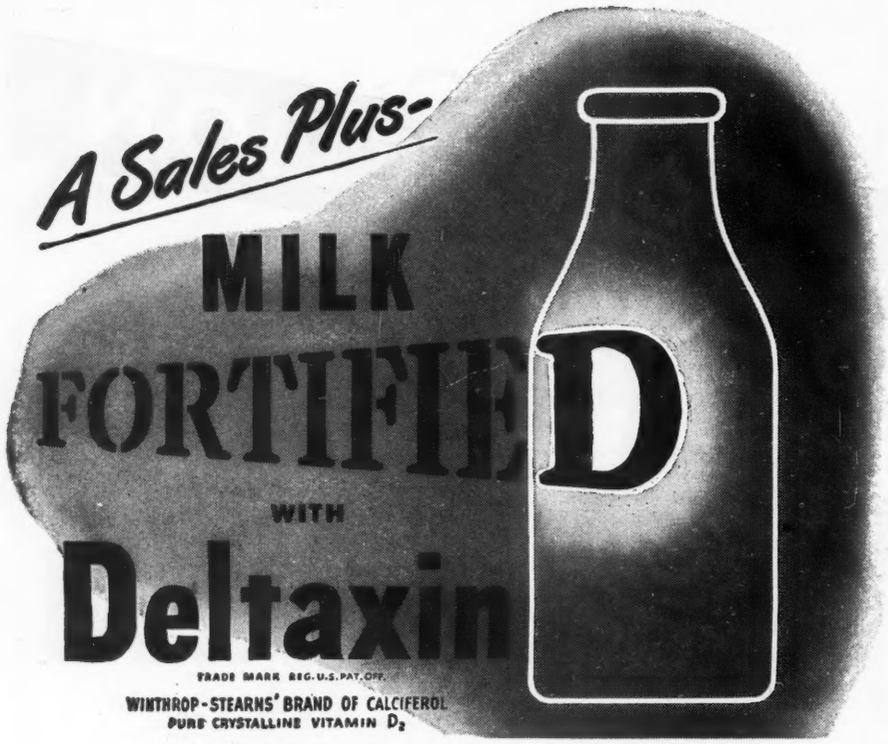

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ECONOMY . . . . . Costs less than one cent per 100 quarts of milk

CONVENIENCE . . . Simply measure and add, or use standardized container for batches of 1,000 gallons

ACCURACY . . . . . Tests made with regular milk (not homogenized) show complete dispersion throughout cream and skim layers.

The Council on Foods and Nutrition of the American Medical Association has declared Deltaxin in propylene glycol suitable for the fortification of Council accepted vitamin D milk.

Deltaxin is available as crystals or in oil solution for the fortification of other food products.

Winthrop-Stearns supplies pure crystalline vitamins, enrichment mixtures and amino acids to leading manufacturers throughout the Food Industry.

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other animals that can assimilate hexose sugars but not pentoses. Molasses from hardwoods contain larger amounts of pentose and therefore give lower yields of alcohol. For cud-chewing animals this molasses should be as suitable as that from soft woods.

Tables showing production from various species of wood and estimates of cost per gal., together with a flow chart are included.

Digest from "Wood-Sugar Molasses From Wood Waste," by E. E. Harris, USDA Forest Service Report No. R1704. Published by the U. S. Forest Products Laboratory, Madison 5, Wis. December, 1947.

Sterile Potato Salad

CANNED potato salad, that is rendered sterile at or below 212 deg. F. without employing undue lengths of time, is the object of a recently patented process. Cut potatoes are allowed to stand for 8-68 hr. in water acidulated with vinegar, or any other acid which has proven harmless in food. They are then cooked in the acidulated water and the water drained away. The potatoes, together with other "light pickled" base materials such as onions and pimientos, are mixed with an emulsified dressing containing egg yolk and an edible oil. The mixture is processed in sealed containers at approximately 190 deg. F. The process is also applicable to macaroni, meats and fish.

Digest from U. S. Patent 2,434,388, issued Jan. 13, 1948, on an application dated June 5, 1936, to Joseph R. Brehm, Auburn, N. Y.

Method of Filtering Bottle Washing Solution

FILTRATION of bottle washing solution assures clean, sweet-smelling solution and eliminates the need for dumping the solution into the sewer to rid the washer of accumulated dirt. The method employed requires a storage tank large enough to hold the total amount of solution in the largest compartment in the washer. The alkali solution, to which has been added a small amount of diatomaceous silica filter aid, is pumped through a filter into the storage tank. The residue is flushed from the bottom of the washer into the sewer, and the filtered solution returned to the washer. Filtering is done at operating temperature, and steam coils in the storage tank maintain this temperature until the filtered solution is returned to the washer. For best results the solution should be filtered frequently.

Digest from "Filtration of Bottle Washer Solution," by R. S. Doughty, Twenty-first Annual Report of New York State Asso. of Milk Sanitarians, 77-78, May, 1948.

BOOKS

Encyclopedia

FOOD INDUSTRIES MANUAL. Published by Leonard Hill Ltd., 17 Stratford Place, W. 1, London, England. 1168 pages; 6 x 8¾ in.; cloth. Price, 42 shillings, in England.

Prepared for the British food industry, this is a revised edition of what amounts to an encyclopedia of food manufacture. Its 14 sections discuss just about every aspect of the subject matter. In the section on Cereals, for instance, milling, flour and baking are considered from the standpoint of ingredients, processing procedures and equipment functions. This material appears in alphabetical order for ready reference.

The alphabetical plan is followed through the other sections embracing sugar confections, canning and preserving, meat products, pickles and sauces, the dairy industry, food dehydration, edible fats and fatty foods, fruit juice products, storage and refrigeration, handling equipment, packaging, boiler house, and composition of foods.

It is perhaps the most complete technical and commercial compendium on food processing to be found anywhere.

Power Plants

ENGINE ROOM QUESTIONS AND ANSWERS. By Alex Higgins. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y., 1948. 154 pages; 8½ x 11¼ in.; cloth. Price, $4.

Since the power plant is a vital part of nearly every large food plant, this book should be welcome as a reference. It deals with the points of engine room design, construction and operation most often encountered in tests for the various grades of certificates for operating engineers.

The question and answer form is used throughout and helpful illustrations and diagrams are used wherever possible.

Worth Its Weight

INDUSTRIAL WEIGHING. By Douglas M. Considine. Published by Reinhold Publishing Co., 330 W. 42nd St., New York 18, N. Y., 1948. 553 pages; 6¼ x 9¼ in.; cloth. Price, $10.

This subject, treated broadly as it is here, is of particular importance to the food field. Little has been written on weighing during the past 25 years. And in that period great strides have been made both in equipment designs and in the uses of scales.

This book may help fill this wide gap in the literature. Certainly anyone interested in scales will find it helpful. It is, however, especially intended for scale users.

Two parts make up the volume. Part I includes design, construction and operations of most types of scales; Part II discusses scales in industry. Two large sections of Part II are devoted to the chemical and food industries, respectively.

Freezing Fundamentals

PRINCIPLES OF FOOD FREEZING. By Willis A. Gortner, Frederick S. Erdman and Nancy K. Masterman. Edited by L. A. Maynard. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 1948. 281 pages; 5¾ x 8½ in.; cloth. Price, $3.75.

Perhaps most of the difficulties so far encountered in the production of frozen foods can be traced to the failure to recognize the basic principles, even though the technical details have appeared from time to time in the literature. This book outlines most of those principles and their appearance in one volume should be most welcome.

Fundamentals on the selection, processing and storage of frozen foods are applicable everywhere, whether conducted in the commercial packing plant, the locker plant or the home kitchen. In presenting this information, the book draws on the engineering, economics, biology and chemistry involved in the process.

The authors are all members of the Cornell University faculty, the first listed being an associate professor of biochemistry; the second, associate professor of mechanical engineering, and the third, research associate in the college of home economics. Dr. Maynard is director of the school of nutrition at the university.

Stainless Steels

FORMING OF AUSTENITIC CHROMIUM-NICKEL STAINLESS STEELS. Published by The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y., 1948. 309 pages; 11 x 8¼ in.; cloth. Price, $4.

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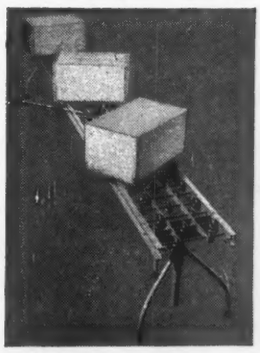

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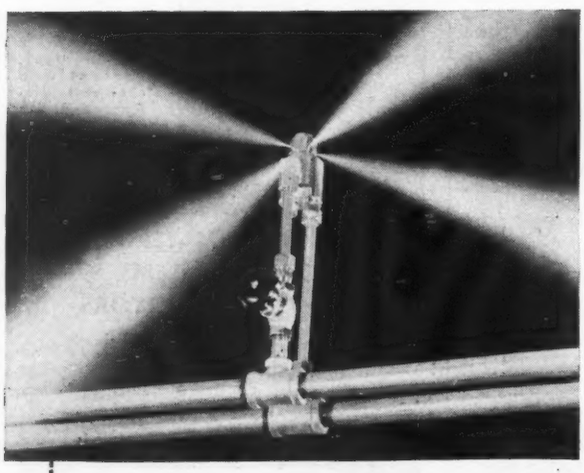
Two methods of our Excelcide Permanent Spraying System are pictured here. The nozzles in both these units develop vaporization so finely atomized that the "fog" will remain suspended for much longer periods of time although utilizing much less insecticide than all competitive and similar units.

The upper unit is a multiple nozzle Excelcide X-L-Jet for use in air or steam lines while the lower unit is supplied from a central supply tank. Both nozzles in these installations completely eliminate the human element and man hours required to spray large areas by hand.

The equipment supplied for these Excelcide Spraying Systems is engineered, designed, and manufactured especially for the Excelcide System by **Spraying Systems Co. of Chicago, Ill.**

Our program is designed for both small and large food plants on control of flies, roaches, weevils, rats, mice, etc.

Write for literature, or a sanitation engineer will gladly call on you at your request, to survey your plant and make recommendations on insect and rodent control.



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We offer through our sanitation engineers, training of personnel and periodic inspections of your plant.

We offer custom built, scientifically engineered insecticidal applicating equipment for all types and sizes of plants.

We can manufacture for you any special specifications on insecticides or rodenticides you designate.

MOVIES

Our exclusive 16mm colored sound tracked movies on insect and rodent control in food plants are available for loan to you upon request.

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in the food industries, this book may well be both interesting and valuable to the food equipment engineer. It reveals many of the developments in the fabrication of chromium-nickel stainless steels. It not only provides details of the properties of these metals, but describes the forming processes used in the production of curved sections and tubing, binding and straight flanging, and the like.

GOVERNMENT PUBLICATIONS

The following recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the Bureau responsible for its issue.

MILK AND CREAM BOTTLES. National Bureau of Standards, Simplified Practice Recommendation R10-47. Price 10 cents. Specifies capacities, weights, dimensions, and finishes recommended as a voluntary standard, effective Dec. 31, 1947.

OZONE IN RELATION TO STORAGE OF APPLES. By H. A. Schomer and L. P. McColloch. Department of Agriculture, Circular 765. Price 10 cents. The evaluation of ozone in apple storage, the effect of ozone in the development of fruit decay and on the quality of fruit.

PEANUTS. Bureau of Agricultural Economics, U. S. Department of Agriculture. Unnumbered, processed. A statistical summary of acreage, yield per acre, production, farm disposition, and value for 1909 to 1945 by States, areas, and for the whole United States.

ALASKA FISHERY AND FUR-SEAL INDUSTRIES. By Ward T. Bower. Fish and Wildlife Service, Statistical Digest No. 15. Price 25 cents. A description of fishery types and data for 1945.

INHIBITION OF PLANT GROWTH BY EMANATIONS FROM OILS, VARNISHES, AND WOODS. By Robert L. Weintraub and Leonard Price. Smithsonian Institution, Publication 3912. Price 30 cents. Discussion of effect of paint vapors on plant growth. Order from The Smithsonian Institution, Washington, D. C.

PUBLIC WATER SUPPLIES IN EASTERN TEXAS. By R. W. Sundstrom, et al. Geological Water-Supply Paper 1047. Price 50 cents. Prepared in cooperation with the Texas State Board of Water Engineers.

PATENTS

Rice Given Quick-Cooking Properties by Substantial Gelatinization and Hydration to Swell Grains to Twice Normal Size with Porous Internal Structure—A. K. Ozai-Durrani, Stuttgart, Ark., to General Foods Corp., New York. No. 2,438,939. Apr. 6, 1948.

Potatoes Cooked, Mashed, Frozen and Thawed Preliminary to Drying to Powdered and Readily Reconstitutable form—A. K. Willetts and T. Rendle, Histon, England, to M.P.P. (Products) Ltd., Norwich, England. No. 2,439,119. Apr. 6, 1948.

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Eggs Coated with Thin Layer of Fluid Plastic Material Preparatory to Breaking—G. F. Hodson, to Wilson & Co., Inc., Chicago, Ill. No. 2,439,808. Apr. 20, 1948.

Cheese Cut into Various Shapes and Sizes by Mechanical Means—A. F. Buroff, Columbus, Wis. No. 2,439,840. Apr. 20, 1948.

Sugar Cane and Sorghum Extracted with Organic Liquid Solvent to Obtain Physiologically Active Material — Wm. J. van Wagtendonk, Corvallis, Ore., to Research Corporation, New York. No. 2,439,914. Apr. 20, 1948.

Dough for Crisp Bread Passed Between Rotating Pricking Roll and Two Brushing Rolls—Aron Birger Svensson, Filipstad, Sweden. No. 2,439,993. Apr. 20, 1948.

Spinach Dry Cleaned by Tumbling in Rotating Trommel with Hexagonal Cross Section—G. D. Gardner, San Jose, Calif. No. 2,440,008. Apr. 20, 1948.

Lean Muscle Tissue Divided into Small Pieces Mixed with Colloid-Like Binder, Blended with Small Quantity of Emulsified Fat, Pressed into Mold and Frozen Solidly Preliminary to Slicing—G. L. Cross, Loudonville, N. Y., to Tobin Packing Co., Inc., Albany, N. Y. No. 2,440,168. Apr. 20, 1948.

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Cooked Ground Meat in Solid Form Covered with Mixture of Milk, Fat and Gelatinized Starch Substantially Solid at Normal Atmospheric Temperatures—J. N. Lesparre, to Armour & Co., Chicago, Ill. No. 2,440,517. Apr. 27, 1948.

Yeast and Yeast- and Vitamin-Rich Products Produced by Growing Yeast on Vegetable Granules Coated with Active Yeast Wort Containing Nutrients Assimilable by Yeast—G. A. Jeffreys, Salem, Va., to Nelson Littell, New Canaan, Conn. No. 2,440,545.

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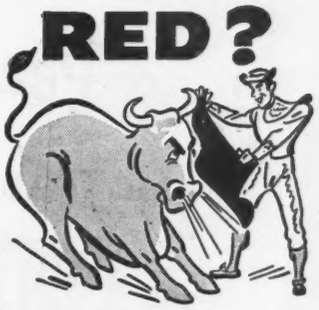
Bulls See RED?



Bulls are color-blind. Scientists have disproved the theory that they "see red." Famous matadors agree that when "El Toro" blows his top at sight of a waving red cape, it's the waving . . . not the red . . . that riles him.

COARSE SALT FOR SAUERKRAUT?

Another popular misconception is the belief among some makers of sauerkraut that they must use the very coarsest crystals of salt. Scientists *know* that light, bulky salt (such as Diamond Crystal's grain for the purpose) spreads more easily in the vat. This results in uniform salt distribution and much better control of sauerkraut fermentation.

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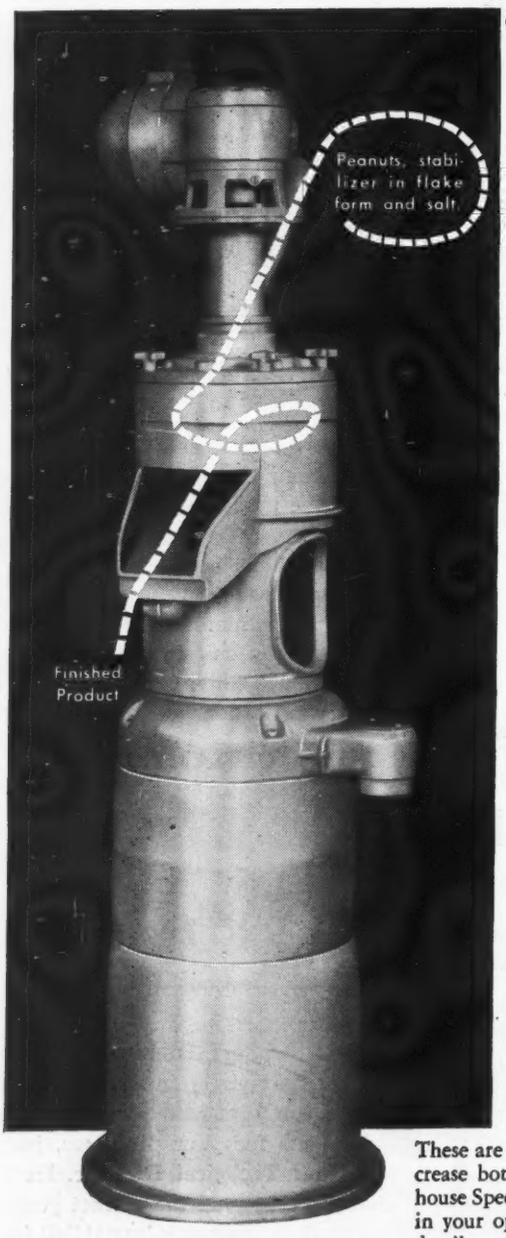

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Glutamate in Food

(*Continued from page 77*)

quate. A case in point is roast beef, which without salt is seriously flat. Nearly all meat products are low in true taste, and so are most vegetable and cereal products, and these benefit greatly from added seasoning. Milk, however, has already so much taste that the addition of salt or other seasoning upsets the balance and the effect is often bad.

At the moment of prime condition, when rushed from garden to kitchen to table, peas or sweet corn have excitingly fine flavor and require the minimum of any addition: little more than salt and butter. "Garden-fresh" is the standard for most vegetables, and is the aim of all cooks in preparing the articles available to them for use. Fortunately, the average quality of fresh, frozen or canned items is better and better, but still it is so far short of the garden-fresh ideal that help is much appreciated from seasonings, condiments and flavorings.

A typical seasoning of great desirability is salt. Sugar is another, of especial value in beverages, in fruits and importantly, in vegetables that have lost some of the garden-fresh sweetness. Monosodium glutamate is another seasoning, which has no odor but which builds up taste. It is "sweet-salty" in general effect. It, like sugar or salt, is more or less specific or selective in the foods which it improves, but in general it is nearer to salt than to sugar in character. It builds up a very desirable flavor in cooked meat and vegetable products. Most interestingly, it also provides feeling stimulus, and is unique among seasonings in this respect. Its over-all influence is that of a seasoning for the moment, which gradually stimulates mouth-feeling nerves to create a lasting feeling of satisfaction.

Where aroma is deficient, odor-stimulating herbs and spices, called condiments, often can supply the lack. Many of these produce immediate bite or tingle as well, such as pepper, cloves, mustard and other spices, but some, such as marjoram or sage, are used mostly for aroma.

When food is very flat, such as cooked, dehydrated vegetables, steam table dishes, or some fish, nearly every type of seasoning must be added. The first and most important step is the building of a pleasant taste background by addition of salt, glutamate, sugar and simple seasoning. If this step is

properly accomplished, the initial flavor will be well blended and well rounded out. The second step consists of the addition of aromatic spices and condiments and herbs in low intensity to build complexity and character.

Finally, bizarre and highly specific flavor effects may be produced by the addition of higher concentrations of aromatic spices and condiments, including such food components as onions, tomatoes and cheese. Thus, food seasoning and flavoring may be accomplished in three distinct steps and in all of these monosodium glutamate mediates to assist in amplifying and blending the total flavor.

—End—

New Packaging Film

(*Continued from page 97*)

motion—all prior to opening the container.

Thus mixed, the product becomes a smoothly colored oleomargarine—without the usual difficulties associated with household coloring of margarine. Now, at least six companies have been licensed to use the Peters' patent for this application.

Cured cheddar cheese was wrapped in the new film. Packages weighing 1, 2 and 5 lb. were stored at about 50 deg. F. for 3 to 12 months. No off-flavor, discoloration, or dry surfaces occurred. Moisture losses of less than 0.1 percent a month were the usual findings with the 5-lb. cheese blocks. Slightly higher percentage losses in moisture occurred with the 1- and 2-lb. packages.

Under controlled processing, the cheddar cheese was wrapped green and cured in the package. The new film proved excellent in the test application, and this method of handling is now being studied under both pilot and actual plant conditions. Commercial promise is seen in this research.

The cheese, when wrapped in the proper manner, will be free of surface mold. The low oxygen transmission and the "cling" properties of the new film contribute greatly to the prevention of the mold growth which is usually found on the surface of cheddar cheese.

Pickles are also packed successfully in Visten bags—brine right in the bag. When heat sealed, the package can be marketed like any other grocery item. The film is so tough that the bags are highly resistant to breakage, hence will not leak brine in the market basket.

Well, Doc, how long will I live?

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Chlorine Sprays

(*Continued from page 75*)

ing 75 gal. of water per minute, averaged about $2.00 a day. On a product basis, the cost of chlorine alone was 1.4c. per 100 lb. of beans packaged, but this does not include charges on the chlorinator.

From the standpoint of the plant management, the advantage of in-plant chlorination most appreciated was the reduction in time required for cleaning. Before chlorination, slime accumulation necessitated suspension of operations about one day in ten in order to give the plant a thorough cleaning. After chlorination, periodic shutdowns no longer were deemed necessary, thus enabling the plant to continue uninterrupted production.

Another advantage of chlorination, was that time formerly required for clean-up between shifts was cut in half—a saving that can be attributed to the elimination of slime from floors and gutters and to a great extent from equipment.

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—End—

Pre-Peeled Potatoes

(*Continued from page 95*)

pockets. This also creates a vacuum which is helpful in loosening the potato skins. With controlled steam pressure and exposure time, the skins can be loosened uniformly to any desired depth.

From the pressure-steamer, the potatoes are conveyed to a rotary-rod washer where they are again tumbled under pressure sprays. Most of the skin is removed by this action.

Two conveyor belts carry the potatoes along the trimming table. Operators remove the remaining skins, eyes or defects and drop the finished potatoes onto a center belt. Any tubers that pass by the operators untrimmed fall to a return belt and repeat the trip on the outside belts. The three belts on this table are made of links of perforated stainless-steel.

The peeled and trimmed potatoes on the middle conveyor travel on to the Plasmo-Cooler*. They move on a stainless steel belt through a water bath at 200 deg. F. This bath, requiring about one minute, sterilizes the surface of the potatoes and plasmolyzes those parts which were recenty hand-trimmed. Tubers are sprayed with cool water at 60 deg. F.

Plasmolyzed to an even depth by the pressure steamer and the plasmocooler, the potatoes move on, via the stainless steel belt, into the Enz-Hibitor*. Here, the potatoes are dipped in a sulphite solution of controlled pH. Quick immersion in this protective bath and subsequent storage under recommended temperature prevent discoloration.

The potatoes are now completely processed and ready for packaging. They are carried on the belt-filler to the weighing machine. The belt-filler has two stainless steel mesh conveyors, one 12 in. wide and the other 3 in. wide. They operate separately on rubber-coated, acid-resistant rollers. The wide conveyor acts as a fast feed belt, its motion actuated by the transverse-weigher controls with an air-driven clutch. When the sack is about 90 percent filled, by weight, the wide belt stops automatically.

Meantime, the 3-in. conveyor continues to operate, delivering potatoes to the bag, one by one, until the weight, within one potato, is made. Another pneumatic clutch cuts off this conveyor. The two conveyors remain idle until the transverse bag-holder is moved by the operator.

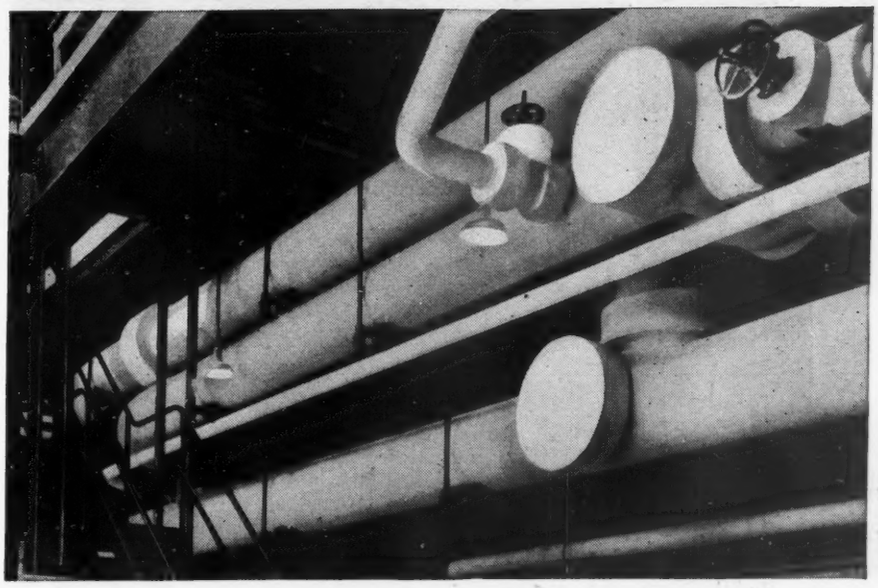
The transverse-weigher is comprised of two hoppers which move transversely across the exit end of the belt-filler. The paper bags are attached to mandrels and are released when filled. Filled bags are removed and empty ones put on by the operator. The unit is equipped with the scale which actuates the movement of the filling conveyors. An electric light illuminates weight indicator when the bag is nearly filled, or filled to the correct weight, or overfilled.

As an empty bag is moved transversely into the filling position, the conveyors of the belt-filler are reactuated, feeding potatoes to the empty bag. These combined units can handle eight bags per minute for filled weight of 60 lb.

Bags are the multiwall type of 3-ply kraft paper. The inside walls are treated to prevent the paper from sloughing off on the product. The bagged potatoes are stored at the plant at 35 deg. F.

* "Plasmo-Cooler" and "Enz-Hibitor" are words coined by Food Machinery Corp. for the units which treat the tubers.

The easy, practical way to cover insulated surfaces



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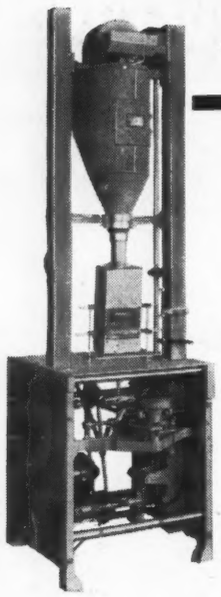
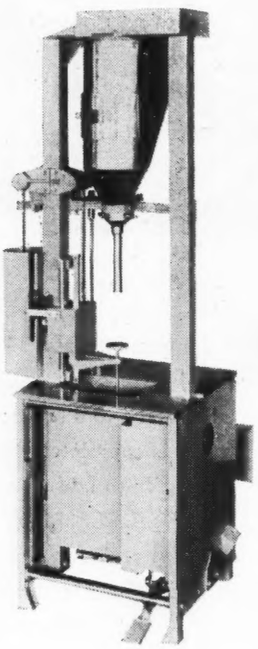
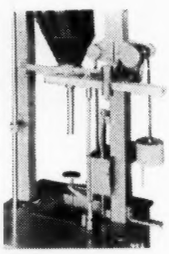


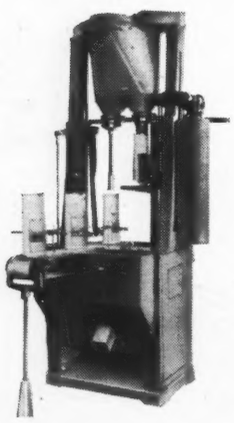
(Left) This G-4 single unit gross weight scale fills by auger feeding the product into the container until desired weight is obtained. One operator . . . production 6 to 10 per minute.

(Far Right) Illustration shows closeup of packing mechanism.

(Right) This G-9 single unit machine fills by auger feeding the product into the container — packing with a desired amount of pressure from the bottom to the top. This machine can also be used for filling paste products.







DHG-88 DUPLEX PACKER AND WEIGHER

(Left) The Duplex Packer and Weigher is very flexible and accurate. Handles from ½ oz. to 15 lbs. . . . bags, cartons, cans or canisters . . . 8 to 15 per minute with one operator (including checkweighing). Has automatic transfer from No. 1 to No. 2 station and automatic take-away conveyor.

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When operating at capacity, the plant uses an estimated 200 gpm. of water. Much of the washing water is used several times. Water is pumped from the Plasmo-Cooler to the rotary-rod washer and to the drum-type washer. Water recovered from the drum-type washer is pumped to a rotary water cleaner; then, when clear, it is pumped to the flood-type washer. Water, potato waste and peel from the rotary-rod washer flow to a sump, located under the unit, and from there are pumped to a refuse screen. The water flows to the sewer and the waste is recovered for hog feed.

—End—

Plant Equipment

(*Continued from page* 106)

sionally a misapplication of a machine) it is comparatively new, the residual value may be appreciable. If equipment with such value is to be replaced, it is only common sense to resell it, if possible, to minimize the loss that outright scrapping would otherwise bring. Therefore, in computing costs of new equipment for replacement purposes, due allowance should be made for residual value of old equipment, less probable salvage value. The net difference will be chargeable against the new machine.

Another factor in such cases will be the maintenance costs on the old equipment. If maintenance records are set up to show the cost of upkeep for individual equipment items, the figures will automatically show when the cost of operating an old machine is becoming excessive.

Finally, records of lost production time should be utilized to evaluate cost of operating old equipment in need of replacement. A comparatively short interruption in production will show an alarmingly high loss in idle time and wasted materials.

Combining the foregoing factors with the capital charges on the new equipment will produce the "justification" aimed at in this step of the procedure. The capital charges, of course, will include depreciation, interest, insurance and taxes. For simplicity, it is assumed that the actual operating charges—direct labor and power—are the same for the new as the old, and need not enter into the calculations. (If not, suitable adjustments in the figures must be introduced.)

The picture will work out about as follows (using hypothetical figures):

	Present equipment	*Proposed equipment*
Date purchased	1942	194–
Initial cost	$5000	$6000
Depreciation rate	10%	10%
Residual book value	$2000	——
Est. resale value	$1500	——
Annual maintenance cost	$ 200	$ 100
Annual lost-time cost	$1000	0
Annual depreciation	$ 500	$ 600
Annual int., ins., taxes (10%)	$ 500	$ 600
Annual total cost, excl. direct operating	$2200	$1300
Annual saving, proposed equipment less resale loss, first year		$ 900
Annual net saving, first year		$ 500
Annual return on $6000 investment		$ 400
first year only		6.7%
after first year		15.0%

The capital charges will be worked out as above. They will be set against the anticipated increased profit from the expanded production. Figures on present capacity and estimated sales will have to be secured and correlated with cost and profit figures. Present costs will be available from actual records, but it should be recognized that estimated future costs and profits based upon increased volume will be subject to later correction.

A typical example, using hypothetical figures, is the following:

	Present equipment	*Proposed equipment*
Annual maximum production	1000M	1200M
Annual estimated sales	1000M	1200M
Unit cost	$ 0.20	$ 0.19
Unit profit	0.04	0.05
Annual profit	$40,000	$60,000
Increased profit per year		$20,000
Estimated installed cost new equipment		$20,000
Annual depreciation @ 12.5%		$ 2,500
Annual interest, insurance, taxes @ 10%		$ 2,000
Annual total capital charges		$ 4,500
Annual net increased profit		$15,500
Annual return on $20,000 investment		77.5%

Needless to say, any sales estimates for the future should be extended for as many years as is practicable. This is necessary so planned capacity increase may be adequate.

Reduced costs will be worked out almost exactly as in the foregoing example, except that the production volume will probably remain unchanged. Savings will result only from the lower unit cost to be obtained by using more efficient equipment. Capital charges must be deducted from gross savings to arrive at net savings and percent return on investment.

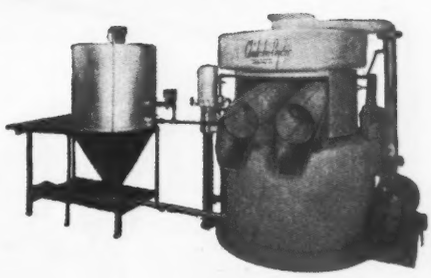
As previously stated, the advantages gained from equipment used to improve working conditions are often intangible. Accordingly, figures are not always available to prove the financial advantage. Use can be made of accident cost data, if elimination of a proved hazard is involved. Improvements in worker efficiency are possible when undesirable noise, vibration, heat or dust

You Recover More

Tender Peas*

After the Quality Grader

***OR LIMA BEANS**



The exclusive patented spiral in the CRCO Quality Grader insures a better, faster separation of peas and lima beans according to their specific gravity—thus recovering more of the tender or fancy product from field runs than any other type of grader. Due to the design of the spiral the brine stream first washes the product free of air bubbles to insure accurate grading. Then any desired separation can be secured by varying the density of the brine stream.

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Cochrane C-B System Helped Solve this Practical Recovery Problem

YOU probably never realized as you drank a cold, refreshing glass of beer that from the residue of the grain used to make it—a high-protein cattle feed could be recovered.

A prominent grain company in Maryland was intrigued by this interesting possibility and devised a successful method of processing the used grain.

First, it is pressed to remove most of the moisture, then a 25-foot steam tube rotating dryer completes the dehydration.

To insure high drying temperatures and positive removal of condensate from the dryer tubes, a Cochrane C-B High Pressure Condensate Return System was installed. Uniform heating of the tubes and the higher temperatures now available have made substantial production increases possible.

The annual fuel savings alone are almost enough to pay for the Cochrane C-B System when the plant is operated 24 hours a day and 300 days a year. This saving is far too important to ignore.

If steam is used in your plant you will be interested in our Publication 3250. It gives complete information on the Cochrane "Closed Circuit" Condensate Return Systems.

Write for a copy of Publication 3250

COCHRANE CORPORATION
3117 N. 17th St., Phila. 32, Pa.

COCHRANE CONDENSATE C-B BOOSTER SYSTEM

85 YEARS OF SERVICE 1863-1948

OF HIGH PRESSURE, HIGH TEMPERATURE CONDENSATE RETURN

are eliminated, or when improper lighting conditions are corrected.

Apart from such quantitative data, the justification of equipment purchases in this category must rest largely upon a description of prevailing conditions and their undesirable effects.

Presentation of data in support of equipment purchases should include estimated cost and carrying charges, even if no return on investment can be proved.

Many of the same considerations apply in the improvement of quality as in the improvement of working conditions—i.e., the arguments tend to be on the basis of intangible benefits and overall policies. Some quantitative assistance might occasionally be derived, as for example, if customers' lawsuits for alleged damages or government condemnation proceedings have been responsible for financial losses traceable to conditions that the equipment was intended to correct. The amount of such losses that the new equipment will save by preventing their recurrence would seem to be legitimate savings to be credited against capital charges.

Arguments can also be advanced for improving quality to protect goodwill, to conform with government regulations, or to keep abreast of competition.

Step No. 7 might be described as the presentation of the pertinent facts to the proper officials, in a form which permits a ready review and decision. This can be done conveniently by using a form providing for all necessary information in a standardized order and arrangement.

It is advisable to establish a procedure whereby prospectuses for new equipment, upon being cast in the standardized form, (Chart 2), may be submitted for executive approval at fixed intervals. These may be monthly, quarterly, semi-annually, or annually. But make sure there are *regular times* for equipment matters to be analyzed and decided.

Little more need be said about those projects which reach this stage only to be rejected by management. No matter how carefully and conscientiously the preliminary steps may be carried out, there will be certain instances when the proposed equipment purchase does not appear wise in the light of overall plant or business conditions. The only further action in such cases is to make sure that all data, including work sheets, are filed for future reference, listing the investigation or project in a "tickler" file.

Operative Millers

(*Continued from page* 124)

able for screening material and for the separation of solids from liquids.

Granulation Tests

Research studies on comparative granulation tests of flour produced from commercially milled straight grade hard and spring wheat, and Michigan soft and hard winter wheat, were reported by Frank W. Wischer and J. S. Shellenberger, Kansas State College, Manhattan, Kan. A wide range in the physical and chemical characteristics were shown, by various tests, to exist among the particle-size fractions. The tests included ash, protein, mixogram, farinogram, amylogram and bake for the hard wheat material.

Progress made by the association in providing facilities for technical education of milling personnel was outlined by Charles R. Veeck, Chairman of the association's Education Committee. He cited: (1) Financial grants for modernization work and research studied at Kansas State College, and expansion of the program in milling engineering at the University of Minnesota, (2) continuation of the association's correspondence courses for millers in their own mills, and (3) continuation of the short courses in milling and sanitation.

This program, he said, is typical of the work that is being done to improve the milling industry, and he announced that over 100 allied firms are cooperating by supplying milling materials to the colleges participating.

As chairman of the association's research committee, Roy K. Durham, Millers' National Federation, Chicago, told millers that his committee had made both general and specific recommendations for improvements in milling equipment.

Durham pointed out the extreme importance of adequate dust collection from the standpoint of health, and avoiding loss of product, fire, and explosion hazards. Another serious problem to be solved is the inability of milling machinery to achieve proper removal of insect excreta and rodent hair in the milling operation. Packing equipment could also be greatly improved, and emphasis should be placed on self-cleaning features as well as ready accessibility to both inside and outside parts. Progress can also be made in small packing operations, and the trend should be toward automatic filling and closing of small family-size flour containers.

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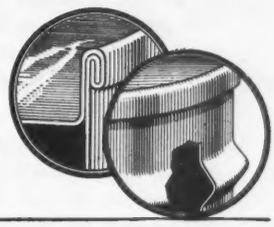

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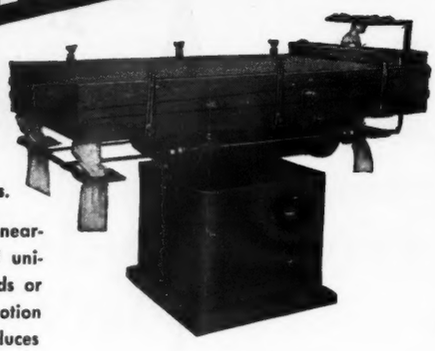

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cluded were: (1) a new double roller mill, Type 480, by Sprout-Waldron & Co., Muncy, Pa., and the company's Pneu-Vac system of materials handling; (2) a double roller mill with tunnel shaft eliminated, by Wolf Co., Chambersburg, Pa., (3) an improved-type Entoleter scourer-aspirator, by Entoleter Div., Safety Car Heating & Lighting Co., New York City; (4) an Allis air-operated roller mill and purifier, by Allis-Chalmers Mfg., Co., Milwaukee, Wis.; (5) a 5800-lb. packer for use with multiwall flour bags, by St. Regis Paper Co., New York City; (6) a Packer Aid Unit for packing 100-lb. open mouth multiwall bags and a smaller unit for bags of 2-10 lb. size, by Bemis Bros. Co., St. Louis; (7) the newly-developed rubber conveyor ("The Zipper") of Stephen-Adamson Co., Aurora, Ill.; (8) a bag-closing machine, by Union Special Machine Co., Chicago, for making tape-bound closures of multiwall bags; and (9) a selector for micron separation and garlic removal from grain, shown by Stephen A. Douglass, Co., New York City.

In addition to the machinery and equipment displays, manufacturers exhibited a wide range of milling supplies and various cleaning accessories.

—End—

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